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ORIGINAL ARTICLES.

THE ETIOLOGY OF DIPHTHERIA.[1]

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OF the infectious diseases there is scarcely one that has passed through as interesting and as remarkable a history as diphtheria. Numerous investigators attempted, at quite an early date, to throw light upon the cause of this dreadful disease. Their efforts, however, were largely unsuccessful, owing to the extreme difficulties presenting themselves at that early period in the study of bacterial affections. In the normal individual the mouth harbors a large number of micro-organisms, and in diseases of the mouth or throat the number and kind of micro-organisms are still further increased. No wonder, then, that this abundant and luxuriant flora of the mouth served to divert and nonplus the early pioneers in this important study.

One thing, however, was certain, namely, that the cause of diphtheria was a microbe—a living organism. It is only too well known that diphtheria is a communicable disease, that it is transmissible from one individual to another. This fact can be explained in but one way, and that is that a living organism is transmitted from one person to another. The attribute of life is essential to the cause of an infectious disease, and diphtheria certainly occupies a front rank in this class.

Our present knowledge regarding the microbic cause of diphtheria may be said to begin in 1883, when Klebs found, by microscopic examination of a number of cases of diphtheria, the bacillus that today is known throughout the world as the cause of diphtheria. During the following year Loeffler succeeded in isolating the bacillus in absolutely pure culture. He was therefore able to describe minutely its morphologic, tinctorial, cultural, and biologic properties, and by so doing furnished a firm, permanent, reliable foundation on which subsequent workers could build with that confidence which has brought about one of the greatest achievements in medicine.

Loeffler confirmed the observations of Klebs regarding the presence of this bacillus in the false membranes of this disease. In twenty-seven diphtheric membranes examined he found the bacillus present in about one-half. On the other hand, in some of the sections examined the bacillus could not be found—a failure due undoubtedly, as he himself points out in 1890, to the fact that some of the early cases studied were not typical cases of diphtheria. Between 1884 and 1890 he examined twenty-one fresh cases of diphtheria, and in every one of these the characteristic bacillus was demonstrated. Inoculations with pure cultures of this bacillus into the trachea of rabbits, guinea-pigs, chickens, and doves produced a croupous-like condition, due to the formation of false membranes. Similar results were obtained by vaginal inoculations in guinea-pigs, and also by applications to the conjunctiva and pharynx. When injected subcutaneously into guinea-pigs a hemorrhagic edema with grayish-white exudate formed.

The fact that the bacilli were always found in guinea-pigs at the point of inoculation, and not within the organs, led Loeffler to conclude that the micro-organisms produced a powerful poison which was absorbed and carried throughout the body. This view was subsequently established by Loeffler's own researches in 1887 and 1888 on the poisonous products of the bacillus, and, above all, by the classic researches of Roux and Yersin in 1888 and of Brieger and Fraenkel in 1890.

Notwithstanding the frequent presence of this bacillus in the disease, and the diphtheria-like results obtained by inoculating animals with pure cultures of the bacillus, Loeffler, with characteristic modesty and reserve, with the true spirit of a scientific investigator, refrained from designating it as the cause of diphtheria. This hesitation was due to several reasons. In the first place, he had found the same bacillus, identical morphologically and physiologically, in the mouth of a healthy child. Again, the typical diphtheric paralyses observed in man were not reproduced in animals; also, when applied to the uninjured mucous membranes of animals, the cultures had no effect. Furthermore, as already stated, the bacillus was not always found in the sections of membranes examined; and, lastly, the bacilli showed a different arrangement in the false membranes from animals compared with those from man. In view of these facts, Loeffler came to the conclusion that, while the bacillus was probably the cause of diphtheria, more investigation would be necessary to prove this relationship definitely.

The doubt expressed by Loeffler as to the relation

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of the bacillus to diphtheria unquestionably contributed to discourage other investigators, for during the next three years practically no further studies were made. In his second paper, in 1887, Loeffler pointed out the constant presence of the germ in ten cases, and at the same time discovered the pseudo-diphtheria-bacillus, which differed from the bacillus first studied, in addition to slight morphologic and cultural differences, in the absence of any pathogenic power with respect to guinea-pigs.

In the following year Hofmann, whose untimely and tragic death will ever remain in the memory of bacteriologists, studied the occurrence of the Klebs-Loeffler bacillus in diphtheria. He succeeded in finding the bacillus in six out of eight cases, but he failed to establish any specific relation between the bacillus and the disease, for much the same reasons that led Loeffler to question the correctness of his own interpretations. Thus Hofmann met with the non-pathogenic, pseudo-diphtheria-bacillus in diphtheric membranes and also in twenty-six out of forty-five diseased but not diphtheric mucous membranes. He likewise demonstrated a marked variation in the virulence of the Loeffler bacillus obtained from different cases, and from old cultures. Furthermore, the virulent bacillus was found in a case of measles, and in one individual out of eleven in whom no throat-complication existed.

In December, 1888, Roux and Yersin published their first memoir on diphtheria, in which they were able to take the definite stand that the Klebs-Loeffler bacillus was the specific cause of diphtheria. They considered themselves justified in taking this position because: (1) they found the Loeffler bacillus present in each one of the fifteen cases of diphtheria examined; (2) by means of pure cultures of the bacillus they reproduced false membranes in animals, just as Loeffler had done; (3) they succeeded with pure cultures in producing paralyses in animals similar to the post-diphtheric paralyses in man; (4) they demonstrated that the bacillus gives rise to poisonous products which, when injected into animals, produced either death or paralyses, according to the dose. This publication of Roux and Yersin attracted widespread attention, and led numerous workers to take up the subject of the etiology of diphtheria. The result of these investigations was the confirmation of Roux and Yersin's conclusions, and, with this achievement once accomplished, it became possible for Behring to enter definitely upon that research which has given, and will give, invaluable benefits to mankind.

Let us consider now, in a somewhat general way, the evidence that has been brought forward during the past ten years regarding the etiology of diphtheria. In the first place, in order that a micro-organism shall be considered as the cause of a disease, the requirement is exacted that it shall be found in every case of that disease. This so-called first rule of Koch, framed at a very early period in the history of the etiology of infectious diseases, assumes some things that, in the light of our present knowledge of the *rôle* of micro-organisms in infection, cannot be disregarded. Thus, that which for clinical or anatomic reasons is described as a definite disease may in reality be far from being an entirety. A rational or natural classification in general biologic science is based upon natural, intimate relationships, and not upon mere appearance or form. The division of diseases by the clinician, based on mere clinical observations, or by the pathologic anatomist, based on anatomic relations, are largely classifications of convenience, and in no wise bring out the relation that is closest and most intimate to the disease—that of the cause. It does not require much reasoning to show that what is clinically or anatomically designated as a disease may have only one cause or may have several distinct causes. In the latter case, what was called a disease becomes, through the study of its etiology, a group of diseases. The old typhoid fever has passed through such a history, and we may say in advance that diphtheria has recently experienced a similar development.

We may now ask ourselves, Is the Loeffler bacillus present in every case of diphtheria? Is the first rule of Koch demonstrated? From the earliest investigations of Klebs in 1883, and of Loeffler in 1884, until the present day, it is evident that the Loeffler bacillus is present in a very large proportion of the cases of clinical diphtheria. In the following table an effort is made to compile all available reports of bacteriologic examinations, from outside the United States, of diphtheria, made in ten cases or more, showing the number of cases examined and the number of times the Loeffler bacillus has been found:

	No. of cases examined.	No. of times Loeffler bacillus found.		No of cases examined.	No. of times Loeffler bacillus found.
Sörensen, 1886	10	7	Baginsky, 1892	154	118
Roux & Yersin, 1888	15	15	Hoppe-Seyler, 1892	37	23
Kolisko & Paltauf, 1889	about 50	In nearly all.	Loeffler & Strübing, 1894	100	75
Ortmann, 1889	16	15	Plaut, 1894	80	22
Zarniko, 1889	20	18	Ritter, 1894	225	225
Babes, 1890	42	42	Phillip—Baginsky, 1894	333	332
Brieger & Froenkel, 1890	22	22	Chaillou & Martin, 1894	198	155
Beck, 1890	53	52	Roux, Chaillou, and Martin, 1894	448	320
D'Espine, 1890	15	11	Feer, 1894	44	38
Escherich, 1890	22	20	Kossel, 1894	117	117
Klein, 1890	22	22	Katz, 1894	128	128
Loeffler, 1890	21	21	Hilbert, 1894	11	11
Roux & Yersin, 1890	80	61	Bernheim, 1894	12	11
Spronck, 1890	13	13	Bergmann, 1894	46	46
Morel, 1891	86	96	Schmorl, 1894	10	7
Pletzer, 1891	12	7	Fraenkel, 1895	about 100	in all but few.
Concetti, 1892	21	16			
Heubner, 1892	113	77			
Janson, 1893	83	63			
Martin, 1892	200	137			
Sakharoff, 1892	19	13		2846	2344
Tangi, 1892	18	18	Percentage,	.....	82.4

From this table it will be seen that in 2846 cases examined by European workers the Loeffler bacillus was met with 2344 times, or 82.4 per cent. The result is somewhat higher than that obtained by American investigators, who, it will be observed, largely through the efficient support of the Board of Health of the City of New York, examined nearly twice as many cases as given in the preceding table.

	No. of cases examined.	No. of times Loeffler bacillus found.
Park, 1892	140	54
Park, 1893	104	73
Park and Beebe, 1894	4795	3255
Morse, 1894	301	217
	5340	3599
Percentage	.....	67.5

If we now combine the results obtained by American and European workers, we shall have 8186 cases, in which the Loeffler bacillus was found 5943 times, or in 72.6 per cent. of the cases.

These two tables contain the results obtained by a large number of investigators, in different laboratories and in different countries, employing at times methods more or less different. In many instances, the cases examined are described as suspicious or very suspicious. The degree of suspicion, as Welch has pointed out, is a relative one, depending on the physician, for when one physician considers a case to be highly suspicious, another may regard it as very doubtful. Accurate, positive clinical diagnosis of diphtheria in many of the foregoing cases is lacking, and the low percentage that these statistics furnish may in part at least be explained by this dilution with suspicious cases. For purposes of diagnosis, of course, the examination of suspicious cases is extremely valuable, but in statistics intended to show the frequency of the Loeffler bacillus in diphtheria they can have but one effect, that of lowering the percentage. This is true in the two tables already given and in the third table, which serves as an excellent comparison with the work of the American bacteriologists, giving the results obtained by the French investigators of the Pasteur Institute of Paris.

These results, it will be observed, are obtained by men working in the same laboratory, employing the same methods of research, and studying cases in one and the same hospital. These figures are already included in the first table. It will be seen from this table that the Loeffler bacillus was found in 73 per cent., which coincides closely with the percentage-frequency in all cases examined. Bearing in mind that these French bacteriologists are all skilled workers, it will be evident that this percentage is low because of errors in diagnosis by the internes of the hospital.

	No. of cases examined.	No. of times Loeffler bacillus found.
Roux and Yersin, 1888	15	15
Roux and Yersin, 1890	80	61
Martin, 1892	200	137
Sakharoff, 1892	19	13
Chaillou and Martin, 1894	198	155
Roux, Chaillou, and Martin, 1894	448	320
	960	701
Percentage	.....	73

The available statistics then show that 73 per cent. of all clinical and suspicious cases of diphtheria contain the Loeffler bacillus. That this percentage will be higher when greater care is taken in diagnosis, excluding suspicious or doubtful cases, is evident. Furthermore, there are other conditions that bear upon the detection of a given micro-organism in disease, and all of these factors tend to lower the percentage. Thus, in the first place, the accuracy and skill of the individual in detecting the Loeffler bacillus are to be considered. The more experience one has in this kind of work, the more easily and frequently will the bacillus be found. Again, much will depend on the method of staining and on the method of cultivation. Certain stains are preferable to others, and the same is true of the medium on which the germ grows. Again, failure of detection may result from conditions over which the bacteriologist has no control. Thus, the material which is removed from the throat may not be from that portion where the Loeffler bacillus is present. Mere touching or scraping of the surface of the membrane does not necessarily carry with it the bacillus, which may, however, be present in the membrane. Again, the Loeffler bacillus may be present, but outgrown by the large number of foreign germs that may be present. In such cases the detection of the germ becomes a mere accident. Further, the bacillus may be inhibited or even prevented in its growth on culture-media by a previous application of antiseptics to the throat. That such cases may and do occur has been shown recently by Plaut.

There is reason, therefore, to believe that the percentage of cases of diphtheria in which the Loeffler bacillus exists is greater than that given in the preceding statistics. With proper care in diagnosis and in the removal of portions of membrane from the throat, supplemented by skilled investigators using reliable, well-tried methods, the percentage of cases in which the Loeffler bacillus is found may rise to a marked extent, as seen from the following table.

	No. of cases examined.	No. of times Loeffler bacillus found.
Phillips (Baginsky)	333	332
Bernheim	12	11
Hilbert	11	11
Katz	128	128
Kossel	117	117
Loeffler and Strübing	100	75
Ritter	225	225
Bergmann	46	46
Fraenkel	about 100	in all but few
	972	945
Percentage	.....	97.2

These figures are already included in the first table. They were all obtained during the past year (1894) by German workers. Plaut's results are omitted because most of his cases were diagnosticated as "suspicious" or "very suspicious."

In connection with the presence of the Loeffler bacillus in diphtheria it should be emphasized, contrary to Hansemann, that there are cases in which the bacillus is present in perfectly pure culture, unaccompanied by any other germ. This is especially true if the examination be made at an early stage, as has been demonstrated by Martin, by Chaillou and Martin, by Fraenkel, and by others. Subsequently, as the disease progresses, other bacteria, especially cocci, make their appearance, and may not only outnumber but even suppress the Loeffler bacillus.

These bacteriologic studies with reference to the frequency of the Loeffler bacillus in diphtheria demonstrate clearly that this bacillus is present in more than the 75 percentage of all cases of real clinical diphtheria, as stated by Loeffler and conceded even by Hansemann. There remain, however, still a sufficiently large percentage of clinical diphtherias from which the Loeffler bacillus is unquestionably absent. In these cases, which, in many respects, are undistinguishable clinically from those in which the Loeffler bacillus is present, other micro-organisms are found. These forms of diphtheria may be due to several other micro-organisms, as has been shown by Roux, Chaillou, and Martin in their researches. They cannot be said to be proved to be causes of such diphtherias, but, nevertheless, there is much reason to believe that such is the case.

The French bacteriologists divide anginas into two groups: First, diphtheric anginas, those in which the Loeffler bacillus is present; and, second, non-diphtheric anginas, those in which it is absent and which, as stated, are undoubtedly due to other micro-organisms, above all to cocci. Thus in 112 anginas examined by Martin, 69 were found to be diphtheric and 43 non-diphtheric. The most common organism found in the latter group in 25 cases was a coccus. The next most common organism was the streptococcus, found in 8 cases, and in a few others the staphylococcus albus, aureus, and other cocci predominated.

In a second series by Chaillou and Martin, 99 anginas were examined, and 70 were found to be diphtheric and 29 non-diphtheric. Of the latter, 11 had the small coccus of Brisou, 11 had streptococci, and 4 had staphylococci. In the 448 cases examined last year by Roux, Chaillou, and Martin, 128 were found to be non-diphtheric. The study of croup by these same observers has likewise demonstrated that all croups are not diphtheric. They may likewise be divided into diphtheric and non-diphtheric croups. The latter, as in the case of the anginas, may be due to the Brisou coccus, the streptococcus, the staphylococcus, and other organisms. As seen from the subjoined table, the number of non-diphtheric croups is much less—nearly one-half—than the non-diphtheric anginas:

	No. of cases.	Diphtheric	Non-diphtheric.
Anginas:			
Martin	112	69	43
Chaillou and Martin	99	70	29
	211	139	72
Percentage	....	.....	34.1
Croups:			
Martin	88	68	20
Chaillou and Martin	99	85	14
	187	153	34
Percentage	...	...	18.2

The bacteriologic examinations show clearly, therefore, that diphtheria, as it is commonly understood, may be due to several causes—in other words, that we have a group of diseases that clinically often cannot be distinguished, but that, nevertheless, are etiologically different. It has been proposed to designate those cases in which the Loeffler bacillus is present as true diphtheria, or bacillar diphtheria, or diphtheria, for short; while those cases in which it is not present are spoken of as false diphtheria or pseudo-diphtheria, coccus-diphtheria, or diphtheroid.

Inasmuch as those cases in which the Loeffler bacillus is present are most numerous and most fatal, this form of diphtheria above all requires our attention. What evidence do we possess, then, that the Loeffler bacillus is actually the cause of those cases of diphtheria in which it occurs?

In order to prove this relationship it is necessary to obtain the bacillus in perfectly pure culture, free from all other micro-organisms. This can readily be accomplished, thus satisfying the second rule of Koch. The pure cultures thus obtained, when inoculated into susceptible animals, must now produce the same disease, with all its symptoms and pathologic changes, and in the animal thus artificially infected the germ is to be found distributed the same as in the natural case. This severe requirement is rarely complied with, for the reason that the animals which are used for experimentation, while susceptible to the action of the germ, can scarcely be expected to reproduce all the details of the disease as it exists in man. Thus the bacillus of glanders, which has been shown to be the cause of glanders in the horse, producing in that animal typical glanders, will, if inoculated into a field-mouse, produce death, but without the slightest resemblance to the disease in the horse. In other animals, as the guinea-pig, the bacillus does produce effects strikingly like those of glanders. Other instances might be cited to show that when experimenting with bacteria on animals other than those in which the disease naturally occurs, variations are met with and must be expected. What, then, is

the effect of the Loeffler bacillus when inoculated into susceptible animals?

Fortunately, the results obtained by such inoculations are so striking and bear so great a resemblance to the natural disease in man as to leave no doubt in the minds of those who are at all familiar with the work that has been done in this direction. The production of experimental diphtheria in animals by Loeffler, and above all by Roux and Yersin, is in itself sufficient to show that the Loeffler bacillus is the cause of diphtheria. Guinea-pigs, pigeons, and rabbits are most susceptible to the Loeffler bacillus. Subcutaneous injections of a virulent culture into these animals almost invariably produce death in from twenty-four to forty-eight hours. A more or less extended gelatinous edema forms at the point of inoculation; a grayish pseudo-membrane forms and the glands are enlarged. Serous effusions in the pleura are common in the guinea-pig, but very rare in rabbits. On the other hand, the liver in guinea-pigs is apparently unaffected, whereas in the rabbit fatty degeneration takes place. The inoculations on the mucous surfaces are especially characteristic. In order to succeed, the mucous membrane must first be slightly injured; otherwise infection does not result. Inoculations in the pharynx, trachea, conjunctiva, and vulva of animals are followed by the formation of false membranes, general intoxication, and death. In tracheal inoculations the false membranes may spread, as Fraenkel points out, covering the entire walls of the air-passages even as far as the large bronchi. The tissues are edematous and the glands swollen. A more striking resemblance to the natural disease can hardly be expected in animals that are not naturally susceptible to the disease.

The post-diphtheric paralyses observed in man have also been reproduced in animals by Roux and Yersin, Brieger and Fraenkel, and others. These paralyses are especially well marked in pigeons, rabbits, and dogs that have been inoculated with a quantity of the germ insufficient to kill in a short time. In from six days to two or three weeks from the inoculation typical paralyses develop and the animal either recovers or eventually dies. The production of false membranes on mucous surfaces and subsequent paralyses in animals complete the resemblance to the natural disease to such an extent as to establish the specific relation of the Loeffler bacillus to diphtheria.

Not only can pure cultures of the bacillus cause the paralyses in animals, but the chemic products of the bacillus can accomplish the same result. The researches of Roux and Yersin on the poison produced by the Loeffler bacillus mark a new era in the study of diphtheria. The filtered, germ-free cultures of the Loeffler bacillus, when injected into rabbits in doses not sufficient to kill in a short time, produce typical paralyses. That similar poisons are elaborated in the body of diphtheria-patients has been demonstrated by these investigators and by others. Thus, the spleen and urine of a child dead of diphtheria were shown to contain the same or similar poisons that, when injected into a rabbit, were followed by prolonged paralysis and death.

The effect of pure cultures of the Loeffler bacillus and of its chemic products on animals may be said to establish its relation to diphtheria. There are, however, two other facts that still further emphasize this relation. In the first place, the high mortality of those cases of diphtheria in which the Loeffler bacillus is present is in striking contrast with the mortality of those cases in which it is absent. This is no accident, much less a myth, as Hansemann would believe.

In the 80 cases studied by Roux and Yersin in 1890, the Loeffler bacillus was present in 61 cases and absent from 19. All of these 19 recovered, whereas of the 61 cases in which the bacillus was present 30 died. Again, of the 200 cases examined by Martin in 1892, the Loeffler bacillus was found in 137 cases and was absent from 63 cases. Of 55 non-diphtheric anginas and croup 7 died; 4 of these, however, became infected with the Loeffler bacillus in the hospital, subsequent to tracheotomy, and 1 died of broncho-pneumonia. Of 137 diphtheric anginas and croups 72 died. The study of the 198 cases presented by Chaillou and Martin in 1894 develops the same remarkable difference in the mortality of the two groups. Thus, in the 198 cases of angina and croup mentioned, the Loeffler bacillus was found 155 times and was absent from 43 cases. Of the 43 non-diphtheric cases 4 died, 3 of these as a result of subsequent infection in the hospital with the Loeffler bacillus. Of the 155 cases in which the Loeffler bacillus was present 83 died. Again, of the 448 cases reported on by Roux and his coworkers last year, treated with serum, 109 died; 320 of these cases had the Loeffler bacillus, and gave a mortality of 98; 128 did not have the Loeffler bacillus, and gave a mortality of 11.

These figures are brought together in the following table, and furnish an interesting subject for study:

	No. of cases with Loeffler bacillus.	Deaths.	Per cent.	No. of cases without Loeffler bacillus.	Deaths.	Per cent.
Roux and Yersin	61	30	49.2	19	0	0
Martin	137	72	52.6	55	7	12.7
Chaillou and Martin	155	83	53.5	43	4	9.3
Average	353	185	52.4	117	11	9.4
Antitoxic serum; Roux, Chaillou, and Martin	300	78	26.0	128	11	8.6

The bacteriologic examination of clinical diphtheria, therefore, shows clearly that the mortality in those cases in which the Loeffler bacillus is present is about 50 per cent. On the other hand, those forms that are clinically undistinguishable from the preceding, but do not contain the Loeffler bacillus, possess a mortality of 10 per cent., which, however, includes those that died of subsequent infection with the Loeffler bacillus. Deducting these, assuming that all would recover, the mortality would sink to less than 4 per cent. Certainly no more remarkable evidence of the etiologic relation of the Loeffler bacillus to diphtheria can be presented than that shown from the study of the relative mortalities.

As a final proof of the relation of the Loeffler bacillus to diphtheria, we will mention in a general way the results obtained from the use of the antitoxic serum. First of all, it is desirable to emphasize the experimental fact that the serum of animals rendered artificially immune to the diphtheria-bacillus or its products will protect absolutely animals against many times the fatal dose of the diphtheria bacillus or of its poison. This fact is as well established by direct experimentation on animals as the chemic fact that sodium hydroxid and hydrochloric acid neutralize each other. Secondly, it will be remembered that in diphtherias in which the Loeffler bacillus is present, poisons the same as those formed in pure cultures are produced and can be found in the organs, as has been done by Roux and Yersin and others. The antitoxic serum that protects animals against infection with the Loeffler bacillus must likewise protect the person afflicted with diphtheria due to the Loeffler bacillus. That it actually does protect is abundantly demonstrated by treatment of diphtheria during the past year.

To emphasize the statement already made, it will be sufficient to present one or two instances. Of the 300 cases treated with the antitoxic serum and reported on by Roux, at Budapest, last September, only 78 died, giving a mortality of 26 per cent. These results were obtained in the same hospital in which Chaillou and Martin established the fact that in diphtheria in which the Loeffler bacillus is present the mortality is above 50 per cent.

Furthermore, showing the specific action of the antitoxic serum on the Loeffler bacillus and its products, it will be seen, from results already cited, that in 128 non-diphtheric cases treated the mortality was 8.6 per cent. against 9.4 per cent. in non-treated cases. The serum is, therefore, without any effect in cases in which the Loeffler bacillus is not present, and in those cases in which it was present the mortality was reduced by one-half, that is, 25 per cent. were saved. Since then the mortality-record has been lowered considerably. Thus, in 128 cases of diphtheria containing the Loeffler bacillus, treated by Katz, only 17 died, giving a mortality of 13.2 per cent.; 117 cases treated by Kossel gave 13 deaths, a mortality of 11.1 per cent.

Because the protection against the Loeffler bacillus is absolute in animals, it must not be expected that similar results will be obtained in man. A certain mortality will necessarily exist, owing to conditions over which the physician can have no control. In experiments on animals, three factors are involved: the animal body, the Loeffler bacillus or its poison, and the antitoxic serum. It is well known from experiments that an animal cannot be saved when the duration of the disease or of the intoxication has been too long. Irreparable injury has already been done. The same results must, therefore, be expected in the human subject when the disease has progressed beyond a certain point.

Furthermore, in the human subject, in addition to the three factors mentioned, another one is to be considered, and that is the association of the Loeffler bacillus with other micro-organisms. It is to-day a well established fact in bacteriology that a given pathogenic germ may be favored or retarded in its action by the presence of other organisms. In diphtheria, both of these conditions are not infrequently met. Roux and Yersin have shown that the virulence of the Loeffler bacillus, with respect to animals, is increased by associating it with the streptococcus of erysipelas. The statistics furnished by Chaillou and Martin are especially valuable in this regard. In their researches, as already stated, the cases of clinical diphtheria were divided, on the strength of the bacteriologic examination, into diphtheric and non-diphtheric. The diphtheric anginas and croups were subdivided into (1) pure diphtheric forms, in which the Loeffler bacillus was present in a pure or almost pure condition; (2) diphtheric forms with microbic associations. The latter associations may vary. At one time there is present a small diplococcus, the coccus of Brisou; at another time a streptococcus; at another time a staphylococcus. In a few words, the same germs that are found in non-diphtheric forms may be associated with the Loeffler bacillus in real diphtherias.

The following table, compiled from the results obtained by Martin in 1892, and by Chaillou and Martin in 1894, demonstrates clearly the effect of microbic associations. All these cases contained the Loeffler bacillus. Those designated as "pure diphtheric" contained the Loeffler bacillus in almost pure culture, the number of foreign germs being very small, if at all present. In those cases designated as coccus-angina or croup, the predominating foreign germ, beside the Loeffler bacillus, was a small diplococcus. It will be observed that the percentage-mortality in this group is much less than in the group of pure diphtheric affections. In other words, the presence of a large number of cocci of this

kind tends to counteract the effect of the Loeffler bacillus. In the third group are included those cases in which, in addition to the Loeffler bacillus, streptococci or staphylococci predominate. Here it will be noticed that the percentage-mortality is much greater than in the pure diphtheric forms. The streptococci and staphylococci, therefore, either increase the pathogenic powers of the Loeffler bacillus directly, or by their own products give rise to additional intoxication, and, therefore, increased mortality:

	No. of cases.	No. of deaths.	Per ct.	Per ct. both anginas and croups.
Anginas:				
Pure diphtheric	96	38	40	.....
Diphtheric with coccus	14	1	7	.....
Diphtheric with streptococci or staphylococci	29	26	90	.....
Croups:				
Pure diphtheric	67	44	66	50.3
Diphtheric with coccus	19	5	26	18.2
Diphtheric with streptococci or staphylococci	25	19	76	83.3

There are a number of other interesting points regarding the Loeffler bacillus, such as the presence of this germ in the throats of healthy children; its occurrence in fibrinous rhinitis; in wound-diphtherias; its persistence in the throat after recovery from diphtheria; its relation to the non-virulent pseudo-diphtheria-bacillus, etc. These facts, however, have but little significance, so far as the proof of the relation of the Loeffler bacillus to diphtheria is concerned, and I shall, therefore, avoid their discussion.

Summarizing briefly the leading points brought out in this paper, it will be seen, *first*, that the Loeffler bacillus is present in much more than 73 per cent. of real clinical diphtherias; *second*, that pure cultures introduced into animals reproduce false membranes, paralyses, and other ill-effects observed in diphtheria; *third*, that the chemic products of the bacillus produce paralyses, diarrhea, intoxication, and death, completing the resemblance to the natural disease; *fourth*, that the mortality is vastly greater in those cases in which the Loeffler bacillus is present than in those from which it is absent; *fifth*, that the antitoxic serum, which possesses a specific action toward the Loeffler bacillus and its poison, reduces the mortality in those cases in which the Loeffler bacillus is present and is without effect in those from which it is absent.

It is this overwhelming evidence that fully justifies us in stating that whenever the Loeffler bacillus is found in a disease it is diphtheria. It was with genuine pleasure that Loeffler could make the definite announcement at Budapest last year, ten years after his pioneer work of 1884, that "The cause of diphtheria is the diphtheria-bacillus."

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A NOTE ON THE TREATMENT OF CATARRHAL DEAFNESS BY PNEUMO-MASSAGE AND PHONO-MASSAGE.

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DEAFNESS due to catarrhal inflammation comes on so insidiously that the impairment of hearing is not noticed in most cases until the conduction of sound is greatly impaired in one ear, if not in both ears. A desire to secure relief without resort to surgery calls for many efforts to devise some form of mechanism by means of which the delicate membranes and bony arches may be restored to their normal condition of elasticity and mobility. This can be best accomplished by a process of exercise or massage, associated with constitutional and local medication.

The Edison phonograph, the vibrometer, and the vibrophone have all been before the medical profession for some time, with strong claims urged for each of them. These instruments fulfil the indications in part by producing a series of aërial impulses which are conveyed to the ear by means of tubes attached to an artificial drum in the instrument, and terminating in suitable bulbs that closely fit the external meatus. The diaphragm of the artificial drum being put into vibration causes a similar movement of the membrana tympani and associated ossicles in the middle ear, thus breaking up some of the adhesions due to deposits of plastic material and inspissated mucus. This movement generally relaxes, and if sufficiently long continued permanently lessens the tension caused by such adhesions, and at the same time frees the drum of the inspissated mucus which mechanically interferes with sound-conduction. This continued action upon the drum, moreover, tends to stimulate the normal secretion of mucus, and thus slowly softens the inspissated masses, which may be dislodged and expelled into the upper pharynx. At the same time it admits of freer ventilation of the middle ear, and consequent equalization of air-pressure inside and outside of the drum, thereby removing one source of tinnitus.

The vibrophone does not possess sufficient force to produce more than very mild impacts, and is, therefore, much inferior to the vibrometer or the phonograph. The vibrometer has one advantage over other instruments in that the vibrations produced by one or the other of the banjo-strings possess a pitch and tone that are agreeable to the patient and sufficiently mild to admit of long sittings. The best instrument for the purpose, however, is the phonograph, which, with the proper diaphragm attached, possesses the maximum of force with the minimum of sound. Such a diaphragm, with the attachment for the stylus, was devised some four years since, and although very delicate in construction, makes a

sufficiently strong attachment for use on the grooved wax-cylinders ordinarily used on the phonograph.[1]

With this diaphragm, and the cylinders grooved as the operator may desire, very forcible impacts with greatly reduced noise can be produced, and can be easily regulated to suit the conditions in each case. This is accomplished with comfort and safety for the patient owing to the movement of the diaphragm which causes the drum to retract, thereby producing, or tending to produce, a partial vacuum by first drawing out the membrana tympani and relieving the internal ear from pressure, and then alternating the pressure as the diaphragm returns to its original position, thus rapidly and continuously putting in motion the membrana tympani and the ossicles, without increasing the pressure on the oval window, and without possible harm to the internal ear.

The phonograph has an additional advantage in that the confusion sometimes complained of when long-continued applications of massage have been made is nicely relieved by substituting a musical cylinder, which is both entertaining and soothing, especially stringed-instrument records, such as of the banjo. The vocal cylinders can be used to determine the quality of sound-conduction as well as the hearing-value, and the orchestral musical cylinders in determining the pitch and kind of instruments best heard and recognized. We may also note the degree of improvement as shown by the additional words and tones recognized and repeated from time to time. The phonograph is, therefore, decidedly the best and neatest instrument for producing what is called pneumo-massage and phono-massage, with the single exception of certain gentle musical vibrations which can be best obtained from the banjo-strings of the vibrometer.

The cases should first be carefully examined, to determine as nearly as possible the seat of pathologic change, the character of deafness as regards the quality of sound, and the sensitiveness both to pain and sounds caused by the instrument in producing vibrations. The instrument is then started at a low speed, which is increased until discomfort or a tendency to vertigo is felt, at which point the maximum limit is reached. The speed is then reduced to a velocity at which comfort is expressed, and retained at that point for several sittings, but may be gradually increased at subsequent sittings. The sittings should be regulated in length of time by the sensations of the patient, so as to avoid mental and physical discomfort (usually from ten to twenty-five minutes), and end by an agreeable musical cylinder, thus diverting attention to pleasant sensations, and at the same time securing mild auditory exercise.

[1] Messrs. Hawthorne & Sheble, the Edison phonograph agents of Philadelphia, 604 and 606 Chestnut Street, have been preparing these cylinders and diaphragms for this purpose after the original model made by Mr. Leeds.

The results of this method, in conjunction with proper alteratives and tonics, and local treatment consisting of applications of tannic acid and glycerol, or weak silver-solutions to the naso-pharynx, antipyrin, and compound tincture of benzoin to the nose (especially over the lower turbinated bone), followed by camphor and menthol in liquid vaselin, and when stenosis from engorgement exists the galvano-cautery applied, will result in marked improvement in many cases of deafness in which the loss of delicacy in motion of the conducting bony chain is caused by pathologic changes not destructive to the continuity of soft or bony tissue. A thorough trial of this method in a large series of cases covering a period of twelve months has convinced me that an absolute cure or return of normal hearing-power in a large proportion of these cases may not be possible, but a considerable number will show the most marked improvement, while in the remaining cases an arrest of progress may at least be expected. Associated tinnitus is likewise relieved or cured in many cases, but a few will yield in neither deafness nor tinnitus in the period mentioned.

The disadvantages of this method are the length of time required and the number of applications necessary to accomplish the desired result; but, notwithstanding these faults, it promises at present the greatest degree of success with the least amount of injurious effects of any method yet proposed, and is altogether our surest method of relief when used in connection with the proper inflation of the middle ear and the necessary local and constitutional treatment.

ORIGINAL ADDRESS.

ADDRESS IN MENTAL DISORDERS.[1]

BY F. X. DERCUM, M.D.,

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FOR many years the public mind in dealing with the problem of insanity has approached it almost exclusively from a practical and utilitarian point of view. The reasons are obvious. The position that insanity and all that pertains to it has occupied in the past has been most peculiar. For ages the insane had been treated as a class that required not only the isolation of the leper, but also the punitive treatment of the evil-doer. In the lay mind insanity involuntarily excited abhorrence and disgust, and was closely associated with ideas of blame and punishment. Indeed, in this day it is by most people regarded as a disgrace if one of their relatives become insane, and often the fact is as much as possible kept concealed. By some unaccountable action of the human mind this peculiarity attaches to no other class of diseases;

[1] Read before the Medical Society of the State of Pennsylvania, at Chambersburg, May, 1895.

at least not in the same degree. It is not strange in view of these facts that the first attempts at the management of the insane in bulk consisted mainly in their housing, and made no other provision for their welfare. Even in these days, when the insane are placed under the care of physicians, the latter are assigned rather the duties of housekeepers, stewards, and executive officers than those of medical attendants. When we consider the attitude of the public mind that obtains more or less to this day, and when we consider the inherent difficulties of the subject, we can readily understand why the science of insanity, especially its pathology, has remained a veritable Africa to medical men.

We must, however, frankly admit that in the practical care of the insane an enormous advance has been made —an advance that has continued unceasingly ever since the days of Pinel, of Tuke, and of Rush. We, too, often look with eyes of reproach upon the science and forget the great practical good that has been accomplished in other directions. Surely the pathway through the jungle had first to be cleared, a semblance of order had first to be established, a knowledge of clinical forms had first to be acquired, before the explorers of this dark continent could devote their time to purely scientific study. In this struggle, in this gigantic task, the alienist is still engaged.

We cannot be surprised that more has not been accomplished when we reflect that the asylum of to-day is only the refined madhouse of former times, and that in it but few opportunities for scientific research are to be found; and, further, to repeat, that the physicians are burdened with executive duties such as should not come within the province of medical men, and of which medicine as a science can take no cognizance.

For this condition of affairs medical men are not to be held strictly accountable. The insane-hospital is for the most part a public institution, and its organization, the plan upon which it is conducted, the financial system upon which it is based, is a reflection of public opinion. The practical politician fails to see the advantages resulting from purely abstract scientific investigation, and yet it is very probable that an increased knowledge of the pathology of insanity will diminish not only the cost of maintaining the insane, but also the actual number to be maintained.

Another and still more serious obstacle has confronted the student of psychiatry, indeed the greatest obstacle of all, and that is the inherent difficulty of the subject. The alienist has been in the unfortunate position of being able to observe surface-indications only, while of the actual underlying principles he could of necessity have no knowledge, inasmuch as both the structure and the function of the gray cortex, except in their grossest relations, were unknown. As a consequence, metaphysical reasoning and vague speculation for a long time took the place of fact and scientific observation.

At last the difficulty promises to be removed; the dawn of a better day is at hand; the marvellous methods of research of Golgi and of Ramon y Cajal, in the hands of such men as Lloyd Andriezen,[1] are revealing the actual, the detailed structure of the human cortex. The beginning has been made of associating structure with mind-action, and the recognition of the fact that mind-action cannot be separated from ordinary brain-action must henceforth be accepted as an indisputable fact. Doubt, prejudice, preconceived notions of all kinds must yield to scientific truth.

Andriezen has analyzed and separated the various elements of which the gray cortex is composed, and the relations of the structures to each other are such that their function seems evident. The incoming, the afferent, fibers, which bring information to this vast expanse of ganglionic matter, the gray cortex, terminate not in ganglion-cells, but in the uppermost layer, the molecular layer, of the cortex. Here their minute divisions come in contact with the minute branches and delicate tufts of the various cortical cells. Significant is it, too, that the insulating material that encircles this afferent fiber is lost when the fiber enters the cortex, so that there is no interference with the proper diffusion, either by contact or induction, of the current which it conveys to surrounding structures. The current, whatever its mode of motion may be, is transferred from cell-process to cell-body and thence perhaps to afferent fibers, or more frequently to countless numbers of other cells—cells whose business it is to associate, to combine, to separate, and to store up impressions.

The limits of the time at my disposal will not permit me to enter into a more detailed statement of these discoveries, but their significance is redoubled when we learn that Andriezen obtained the most interesting results when he directed his attention to one of the simpler forms of insanity, namely, one in which the cause is definitely known, and in which the symptoms are well established and relatively simple in character: I refer to alcoholic insanity. Andriezen found, first of all, that the neurons showed changes in the cell-bodies and in the nuclei. There were swelling and indistinct staining of the intercellular chromatin-rods. There were also coarseness and increased staining of the nucleus, changes that indicate that in alcoholic insanity the cell-protoplasm and cell-nuclei are the seat of serious nutritive disturbances. Especially, however, did Andriezen note alteration and destruction of the fine naked collaterals and nerve-terminals of the molecular layers of the cortex—the very layer in which afferent impressions are first communicated to the nerve-cells of the cortex. There were also swelling and softening of the very minute protoplasmic granules attached to the special processes in the superficial quarter of the cortex. These changes, "dynamical changes," as Andriezen calls them, doubtless explain the diminished sensitiveness and alertness of the alcoholic to incoming sensory impressions, and similarly a diminution of the spread of the excitation from one area to associated areas. To these changes and to the changes in the cell-body are also to be relegated the amnesia of the alcoholic state. We have here the first instance in the history of insanity in which it has been possible to correlate closely cause, structural change, and symptom. Surely a beginning has been made in this brilliant research that augurs well for the future.

It is to be hoped that these results will everywhere stimulate the foundation of laboratories in hospitals for the insane. To be sure, a few such laboratories already exist, but too often the pathologist meets with but scant support both from the Boards of Trustees and from the

[1] Brain, Winter Number, 1895; also 1894 Journal of Mental Science, p. 673, abstract.

medical officers of the institutions. Everyone should realize that there is no longer an excuse for the ignorance that exists in reference to the changes in the cortex of the insane. The methods of Golgi and of Ramon y Cajal, as Andriezen has shown, are capable of revealing the most astounding secrets, and one of the most urgent demands upon the time of the alienist should be histologic and pathologic research.

The story, however, does not end here. A second field of work is beginning to claim attention—a field more wide, more vast even than that which has been opened up by Andriezen. After all, whilst the detailed study of the sane or insane cortex will enable us to correlate structure with function and change of structure with change of function, it cannot, save in special instances, as in the case of alcohol, where the cause is clear and self-evident—it cannot of itself reveal the underlying or initial causes that effect these changes. Even if it be possible to correlate the symptoms in the case of mania or of melancholia with dynamic changes in the cell and its processes, it cannot be expected that the agent which produces these changes can be brought to light by this method. After all, the changes that we see are but effects, and are in many instances purely terminal results.

The conviction is steadily growing in the medical mind that the actual agents which produce tissue-changes are chemic agents, toxic substances of one kind or another, no matter what their origin—in one instance absorbed or ingested from without, in another the poison elaborated by bacteria, and in another the poison of altered tissue-metabolism, of abnormal and deranged visceral function.

Unfortunately, we can to-day say little that is fixed and definite upon this subject, and yet enough is known to indicate that we have here vast fields of undiscovered truth. That toxic substances are formed in the blood, that toxic substances are excreted by the urine is well known. This is true both of substances formed by normal and abnormal tissue-metabolism. We need here only allude to the writings of Bouchard upon this subject to recall how the retention of well-known products may cause such symptoms as asphyxia, uremia, uricemia, cholemia, glycemia, etc. A number of French observers, among them Bouchard, Lépine, and Guerin, have isolated alkaloidal substances from normal urine, while Selmi and others have isolated basic substances from pathologic urine. Griffiths, for instance, has obtained ptomains from the urine of scarlet fever, diphtheria, pneumonia, whooping-cough, measles, glanders, and epilepsy. None of these substances exists in normal urine. Luff has isolated a ptomain from the urine of typhoid fever. Albu has discovered ptomains in various pathologic urines, whilst Ewald isolated ptomains from the urine in cases of carcinoma of the stomach, of uremia, and of Addison's disease. It is also known that the urine in melancholia has an increased toxicity, while in mania the toxicity of the urine is decreased while that of the blood is increased. Enough, therefore, is known to justify us in discussing the probable relation of these toxic substances to the nervous system.

That the nervous system is markedly influenced by the presence of toxic substances in the blood is, of course, well known. It remains only to outline a classification of these agents. To begin, certain toxic substances are normal constituents of the blood and urine, and only under certain circumstances are present in excess, when they assert their toxic action. Thus Mosso demonstrated the toxicity of the blood of fatigued animals, while Arbelous demonstrated the same fact not only as regards the blood, but also as regards the muscles of fatigued animals. Lepicque and Marette demonstrated in addition that fatigue increased the toxicity of the urine. It is probable that in these facts is to be sought a partial explanation of some of the phenomena of neurasthenia and of those graver forms of nervous exhaustion that eventuate in insanity. In other words, we have an intoxication of the nervous system in such cases from the mere accumulation of tissue-waste; or, to put it in scientific language, the products of excessive tissue-metabolism.

Closely allied to these substances are those that are present in the various diathetic insanities in which toxins are present, some of which may in smaller quantity be normal to the urine, while others are new and foreign. Thus in the insanity of gout we have doubtless to deal with uric acid, a substance normally present in the blood in small proportion, whilst in rheumatism we deal with a substance new and foreign. This is also true of the toxins of diabetic and of carcinomatous insanity. Regarding carcinoma, it may be stated that the toxicity of the urine is always in excess of the normal, proving thus the presence of some poisonous substance.

Next in order come the various toxic insanities due to disordered visceral action. Regarding these we have but little information. Enough is, however, known regarding the diseases of the kidneys and of the liver to indicate that the insanities associated with these affections are in all probability the result of autointoxication, the poisons being generated in consequence of the disordered action of the viscera. It is not at all improbable that disease of other viscera—probably of all of the viscera—is attended with the elaboration of substances that have a toxic action upon the nervous system, *i.e.*, autotoxins.

Next we should consider the introduction of toxic substances from without, and for the present we shall exclude all poisons ingested as such. From much that we know, we have reason to infer that under certain pathologic conditions poisons are formed in the stomach and intestines which act profoundly upon the nervous system. Massetti, who has especially studied this subject, comes to the following conclusions: First, that if there be a change in the process of gastric digestion by which, as a result of abnormal fermentation, noxious substances are produced, these when absorbed may in a predisposed individual cause disturbance of function of the nerve-centers. Secondly, disturbance of the gastric function secondary to disturbance of the nervous centers may in certain cases lead to the absorption of abnormal materials from the gastro-intestinal tube, which may aggravate a pre-existing mental malady and may retard recovery. Thirdly, the stomach, like the rest of the digestive tube, is, among other things, an organ for the elimination of a toxic principle pre-formed and circulating in the blood. Unfortunately, here, as elsewhere, our knowledge is as yet too indefinite to enable us to speak with precision, and yet the occurrence of intoxication from the intestinal contents is of itself not open to question.

We have still to consider briefly the toxic conditions resulting from infection: for example, influenza, typhoid fever, the eruptive fevers, erysipelas, septicemia, etc. Here the action of the toxic agents resolves itself, as Regis points out, into two separate conditions, depending entirely on the period at which the symptoms of intoxication make their appearance. If these appear during the acute febrile state, they assume ordinarily the form of acute delirium; whilst when they occur during the post-febrile period they produce a mental condition in which confusion, stupidity, stupor, and psychic asthenia are the prominent symptoms. It is not improbable that the symptoms occurring both during the acute febrile period and during the post-febrile state are due to the toxins elaborated by the bacteria of the disease, and are in a sense comparable, the first to the stage of acute alcoholic intoxication, the second to the mental impairment and asthenia of the chronic alcoholic period.

It appears that the various intoxications of the nervous system resolve themselves into two great groups—*first*, the autointoxications, properly speaking, which embrace, first, the substances normal to the blood and secretions, but present in excess; secondly, those substances due to the general disturbance of tissue-change met with in diathetic conditions; and, thirdly, the poisons formed by the disturbed action of special viscera.

In the *second* group we have, first, those substances absorbed from the intestinal tract, some of which are produced, as we have seen, by disordered chemic action and morbid fermentation of its contents, and others normally excreted by the intestinal tract, but under abnormal conditions reabsorbed; secondly, we have the poisons that are the direct results or accompaniments of infection.

While we know comparatively little of the detailed chemistry of these poisons, we are justified in stating the following proposition, namely: that the most diverse agents may produce the same or at least similar clinical phenomena. For instance, the toxic action of alcohol resembles very closely the toxic action of the poison of an infection. The delirium of the febrile period of an infection may closely resemble alcoholic delirium. Again, the insanities coming on in the post-febrile or convalescent period, the so-called asthenic forms of insanity, in which weakness, stupor, and depression are the cardinal features, so closely resemble each other as to be practically indistinguishable. Nevertheless they may result from widely differing infections.

The determination of the toxicity of the urine, of the blood, or of other tissues and secretions implies of necessity experiment upon animals. If an alkaloidal substance be isolated from the urine, its toxicity can alone be demonstrated by experiment. The toxicity of the blood can only be proved by its injection into the veins or into the peritoneal cavity of some animal—a mouse or a guinea-pig. It is to be feared that attempts in this country to prosecute such lines of research may meet with opposition. "Public opinion," which too often is synonymous with public ignorance and public prejudice, may for a time prevent the establishment of experimental laboratories in hospitals for the insane. But perhaps at no very distant day, when it becomes clear that the pecuniary outlay demanded of the State for the care of its insane will eventually be diminished by the prosecution of just such researches, the opposition may be withdrawn. As a matter of fact, every asylum, every hospital for the insane should have attached to it not only a laboratory for the study of the microscopic changes in insanity—changes that by the improved methods now at hand, notably those of Golgi and Ramon y Cajal, promise to yield great results, but also for the determination of the various toxic substances, their origin, their chemistry, and their mode of action upon the nervous centers. As we have already stated, the microscope can at best reveal only the wreckage in the path of the storm, whilst the chemistry of the tissues and of the excretions and experiments upon living animals will enable us to determine the actual causes and the actual sequence of the changes.

That consideration of the pathology of insanity from the standpoint here taken has a practical bearing there can, I think, be no doubt. If it be true that certain of the psychoses are due to intoxication through the stomach, certainly one of the first indications is lavage and other local treatment of the stomach. Indeed, to my mind, it seems good therapeutics to practise lavage in the majority of cases of the depressive forms of insanity, for instance in melancholia and in the various stuporous forms of insanity, not because we believe at this day that these insanities are due to the direct absorption of substances formed by abnormal chemic changes in the stomach, but because it is exceedingly probable that toxic substances even normally excreted by the stomach may, in these conditions, be reabsorbed. Again, if it be true that the psychoses are so largely due to the action of toxins, certainly hydrotherapy, so grossly neglected, acquires a value altogether unexpected. Its application should embrace not only the stimulation of the skin by baths and douches, but also the ingestion of large quantities of diuretic waters. Finally, if the psychoses are due to the action of toxic substances, we shall be in a better position to treat these affections when the action of these toxic agents is known—we shall be in a better position to suggest the proper remedial agents.

CLINICAL MEMORANDUM.

COMPOUND FRACTURE OF THE SKULL, WITH SEVERE LACERATION OF THE BRAIN, IN AN INFANT TWO MONTHS OLD, WITH RECOVERY.

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THE following interesting case of severe injury to the brain of an infant, less than two months of age, is not without interest, but is worthy of record in the archives of surgical literature. It shows the tolerance of very young children to severe wounds, even when such injuries implicate vital organs. Although familiar with the histories of very many severe injuries to the skull and the brain itself, I am not able to find among surgical records a single case in which so young a child has met with so severe an injury and made so rapid a recovery—if indeed there has been recovery after such an injury.

The following notes, carefully and correctly taken at the time of the injury, will suffice to lay the case before the profession.

On Sunday, April 21, 1895, I was hastily summoned in consultation to see an infant boy, a child of Mr. E. H., the Imperial German Consul at this port. The child had been born February 26, 1895, and was consequently on the day of the accident just fifty-four days old—less than two months. The parents having gone to attend services at church, the nurse, with whom the child had been left, placed it in its little carriage and rolled it upon the front gallery, which is elevated from the ground eight feet, and reached by a flight of rather steep steps, eleven in number. She carelessly left the infant in charge of two little children upon the gallery and went to the rear of the house for some purpose; whilst she was absent, it is supposed the little ones, in play, pushed the carriage toward the landing of the steps, over which it toppled and fell to the bottom and out upon the walk. The child was thrown out at the time the carriage upset, and, in falling, the little steel rod which supports the sunshade struck the frontal bone just above the orbital ridge over the right eye, penetrating the skull and entering the brain to the distance of about three-quarters of an inch. (I *estimated* this depth from the stain of blood and brain remaining upon the rod.) Entering the skull with much force, it appeared to have torn itself outwardly as the child, which evidently had been impaled upon the rod, fell away from the carriage. The wound extended upward and outward on the right side of the frontal bone, from just above the orbital ridge, near to the sagittal suture, a distance of very near, if not entirely, two inches. The rod measured three-eighths of an inch in diameter, and at the point was rough and jagged, just such an instrument as would be calculated to inflict such an injury. There was considerable loss of blood, and at least a dessertspoonful of brain-substance was scattered upon the inside of the sunshade, upon which the child had fallen; besides, an equal amount had been smeared upon the face and some considerable quantity oozed from the wound. The wound was a horrid, lacerated gash, and from it was trickling a flow of dark-colored venous blood, to all appearances coming from the longitudinal sinus. There was no depression of the skull, but rather an eversion of the torn integuments, with a bulging outward of the edges of the fracture, as if they had been forcibly turned out by the rod of steel after penetrating the skull and then ripping up.

The shock was profound, and the child was almost insensible, deathly pale, and pulseless. To all appearances the case was hopeless and surgical efforts were seemingly of little avail—in fact, the child was apparently in *articulo mortis*. Unwilling to abandon the case to a certain death, I concluded to wipe away the extruding brain and close the rent in the forehead, more with the intent of making it a less repulsive corpse than with any hope of effecting a cure! To this end I closed the wound with interrupted silk sutures carried through the scalp and including the pericranium, down upon the skull itself. I was not able, except by pulling aside the edges of the skull, to catch up the dura, else I should have also closed that membrane before closing the integuments. At the point of entrance of the rod, where the integuments were perforated, I left it open for drainage, if perchance the wound should unite. The skull was so soft, very little firmer than a dense sheet of cartilage, that it was an easy matter to bring the edges in close apposition and retain them there by a compress of iodoform-gauze, with a bandage carefully adjusted. As stated, the shock was so profound that the child did not cry or give evidence of the least pain during the introduction of the sutures or in the adjusting of the dressing, being as quiet as if under the influence of an anesthetic. This was about one o'clock in the afternoon, and I had little thought that the child would live through the night. When I again called late in the evening I was astonished to find that reaction was almost complete, with an absence of fever, and that the child had rested quietly and nursed from its mother as it had usually done.

During the night the child suffered a good deal from colic and the temperature had run up to 102°. The infant was restless and irritable. I ordered quiet, and phenacetin, gr. ss, every two-and-a-half or three hours until the temperature came down.

On April 23d the temperature had fallen during the night to 99°, the babe had rested quietly, its functions were normal, the bandages were saturated with cerebro-spinal fluid. I readjusted the bandages and found that the flow of fluid was rather profuse, as it ran out and trickled down the child's face. I instructed the mother to absorb it as well as she could, but to avoid any pressure upon the wound.

On April 24th the morning temperature was 98.4°. There was no appreciable change in condition of wound or child. The noon temperature was 99° and at 3 o'clock P.M. it had increased to 100°, but at 7 P.M. had fallen under the administration of phenacetin to 98.4°.

In the morning of April 25th the child was evidently more comfortable, and with the exception of a slight attack of colic during the night had got along very well. At noon the temperature was 99°, and at 6 P.M. it had risen two-fifths of a degree. The wound appeared healed, save at the drainage-point, from which a continued flow of cerebro-spinal fluid issued. The child's functions were normal, and it appeared as well as if no accident had happened to it.

On April 26th the child was evidently doing well, and nursed regularly and slept quietly; the temperature remained at 98.4°. The wound appeared soundly healed, save at a small point in the lower angle, from which there continued a rather profuse flow of cerebro-spinal fluid. I concluded to try to arrest this by pressure over the spot, and, having dusted it thickly with boric acid and put on a little compress of gauze, I confined it by a narrow strip of rubber plaster and a bandage. This proved of no avail, for the fluid continued to flow and saturate the dressings, and, as the bandage and plaster seemed to give the little patient discomfort, I concluded to remove all dressing, save a simple fold of gauze to absorb the fluid, and to leave the treatment to the unaided efforts of Nature. The sutures had been removed on the sixth day, and as the wound was entirely closed, save at the minute opening from which the fluid issued, there were no indications to be fulfilled other than quiet, good nursing, and waiting for developments. The next three days, the 27th, the 28th, and the 29th, were passed without any change, with the exception of the night of the 29th, at which time the fluid ceased to flow, and the little opening on the morning of the 30th was closed as tightly as the entire line of wound.

I visited the child again on May 1st and 2d, and finding it perfectly well, with only a narrow line marking

the place where the rent had opened the skull, I concluded to discharge the case from my list.

A few days ago I called to see the little patient and met the nurse with it in the yard. The mother informed me that it had never had a single bad symptom, that all its functions were normal, that it nursed and slept as all her children had done. When questioned as to whether the child was as bright as children usually are at his age, now going into its fourth month, she replied: "Doctor, I think my little boy is the brightest child I have had; he laughs, and plays, and cooes, and is the dearest little fellow in the world."

Such is the outline of this case, which I record as interesting on account of the gravity of the injury, and being followed by such speedy and satisfactory an issue. I might mention the profuse discharge of fluid as exceeding my expectation, although it was not possible to measure the quantity lost, as it was absorbed by the dressings as it issued from the wound; judging from the saturated condition of the gauze, bandages, and little cap which was put on to keep the dressing in place, I feel safe in *estimating* it to have been not less than six or eight fluidounces.

BACTERIOLOGIC NOTE.

A CULTURE-MEDIUM FOR BACTERIA.

BY A. M. BLEILE, M.D.,
PROFESSOR OF PHYSIOLOGY IN THE OHIO STATE UNIVERSITY, COLUMBUS, O.

TO the already long list of culture-media I wish to add the formula of another. White of egg is thoroughly shaken with ten volumes of water, and for every hundred c.cm. of this mixture one c.cm. of hydrochloric acid is added, with a few grains of pepsin, and the whole is kept in the incubator at 40° C. for four hours. The mixture is then neutralized with a solution of equal parts of sodium hydroxid and potassium hydroxid, boiled, and from 10 to 12 per cent. of gelatin or 1½ per cent. of agar added, again boiled and neutralized if necessary, and then filtered.

This medium has been in use in our laboratory for more than a year and has given general satisfaction. It presents several points of advantage over the ordinary media. In the first place, in the summer-time it is difficult to keep the meat-infusion the prescribed time without ice. The egg-medium has the advantage of a greater initial freedom from spores and bacteria; it does away with the use of the somewhat expensive peptone; it requires less weighing and only one filtering; it is fully as rich in nitrogenous matter as the meat-infusion; and it is richer in salts.

NEW DEVICE.

A NEW PLEXIMETER.

BY BOARDMAN REED, M.D.,
OF ATLANTIC CITY, N. J.

IN determining the position, size, and exact boundaries of the accessible abdominal organs, indirect percussion offers distinct advantages over direct percussion. It enables the physician to detect more delicate shades in the percussion-note, such as those between the resonance over the stomach and that over the empty colon, and in determining the boundaries between the colon and the small intestine.

For the new specialty of diseases of the digestive organs, which is now assuming such great importance in the medical world, a good percussor and pleximeter are therefore indispensable. The percussors found in the instrument-stores are generally satisfactory, but not so the pleximeters. All that I have seen hitherto are inconvenient to use, and very awkward to carry in the pocket. The following cut represents a pleximeter I have devised to overcome these defects:

It is made of rubber of medium hardness, so as to be moderately elastic and yet rigid enough to permit of being pressed firmly against the part percussed. The ends are of unequal size, the smaller end usually serving as the handle, but in percussing between the ribs of children, above the clavicle, or in any place where very delicate percussion is necessary, the larger end may be used as the handle, while the smaller serves as the pleximeter.

MEDICAL PROGRESS.

Tonic Blepharospasm Simulating Ptosis.—PERSHING (*American Medico-Surgical Bulletin*, June 1, 1895, p. 662) has reported the case of a lawyer, fifty-four years old, who complained of inability to keep the eyes open, developing in the sequence of excitement and anxiety, in conjunction with excessive smoking and great physical exercise. At first an extra effort was sufficient to raise the lids, but soon the forehead had to be wrinkled and the head thrown back, and sometimes the lids had to be held open with the fingers. For a time the difficulty occurred only in using the eyes in near work, or when they were irritated by the wind. To the patient it seemed that the lids were forcibly held together, and he discovered that pressure on a certain point on each cheek was nearly as efficient in keeping them open as actually holding them apart. Some astigmatism and hyperopia existed, but the muscular balance was perfect. The drainage of tears through the lacrymal duct was imperfect, and their accumulation provoked the spasm. The instillation of a drop of distilled water into either eye also caused contraction. Under the anesthetic influence of cocain the difficulty of keeping the eyes open disappeared. No evidence of organic disease could be detected, and the conclusion was reached that the condition was one of tonic blepharospasm of the orbicularis.

Gonorrhea of the Rectum with Uro-genital Blenorrhea in an Infant.—LEWI (*Archives of Pediatrics*, vol. xii, No. 6, p. 437) has reported the case of an infant, six years old, who, after treatment in a public institution for right-sided empyema, presented a discharge from the vulva and the anus. Just within the anal ring were small erosions, evidently ulcers in the rectal wall. On introduction of a speculum, the mucus membrane for several centimeters above the anal opening was found swollen, angry, spongy, and bleeding easily. Thickened pus, greenish in hue, came from the parts above, indicating

involvement of the rectum higher up. There was a history of rectal tenesmus, with four or five passages daily. Not only were these movements attended with a purulent discharge, but the pus seemed to flow from the rectum in the intervals. The urethral opening was swollen, angry-looking, and discharged pus. The parts about the vulva were much inflamed, and thick greenish pus flowed from the vagina. Bacterioscopic examination of pus from both vagina and rectum disclosed the presence of gonococci. The infection is ascribed to carelessness on the part of a nurse in ordinary ablution, or in the use of an unclean syringe.

Fatal Cerebellar Hemorrhage in a Young Woman, with Glycosuria.—OLIVER (*Lancet*, No. 3742, p. 1237) has reported the case of a woman, nineteen years old, who, while apparently in good health, suddenly lost consciousness. The pupils were contracted and equal, and did not react to light, and there was no paralysis. The pulse was 22 and the respirations 10 per minute. No cardiac murmurs were detected, and there was no peculiar odor of the breath, and no evidence of poisoning. The urine was withdrawn by catheter and contained no albumin, but a large quantity of sugar. Despite active treatment death ensued thirteen hours after the first symptoms. Upon post-mortem examination the only lesion found was a blood-clot in the middle lobe of the cerebellum. The superior surface and the posterior surface adjoining the inferior surface of the middle lobe were lacerated, exposing the clot, which was found to extend across the center of the organ, approaching quite close to the surface of either side and splitting the cerebellum into an upper and lower layer, though there was no evidence of a new-growth.

Supernumerary Urethra.—At a recent meeting of the Académie de Médecine PÉAN (*La Presse Médicale*, June 1, 1895) presented a girl, fifteen years old, who had suffered with dribbling of urine from birth. On examination a prominence was found upon the anterior wall of the vagina, increasing in volume with physical effort, and diminishing in the recumbent posture. Upon compression of this swelling with the finger urine was observed to escape, not from the normal urethra, but from a second opening, about 3 mm. below. A stylet introduced into this opening penetrated into a cavity from which also urine escaped. On occlusion of the lower opening with the finger and compression of the tumor this was reduced in size and the patient felt a desire to pass urine. It thus appeared that there existed a diverticulum of the bladder with a supernumerary urethra, as a result of which, in the absence of a sphincter, there was dribbling of urine. The condition was relieved by exposing and excising the supernumerary parts.

The Nature and the Treatment of Pernicious Anemia.—STOCKMAN (*British Medical Journal*, No. 1794, p. 1085) expresses the opinion that pernicious anemia is not a special disease, but is secondary to numerous exhausting conditions. These induce an initial anemia, which is followed in certain cases by degenerative changes in the bloodvessels. Capillary hemorrhages result and induce an excessive degree of anemia. Some cases are due chiefly to external bleeding, which accounts for the characteristic symptoms and post-mortem appearances. The treatment should, therefore, be based on etiologic considerations.

THERAPEUTIC NOTES.

Methylene-blue for Filaria Sanguinis Hominis, with Chyluria.—FLINT (*New York Medical Journal*, June 15, 1895, p. 737) has reported the case of a well-developed colored man, twenty-two years old, born in the West Indies, engaged as a bar-porter, and residing in the United States for ten months, who presented himself with headache, pain in the sacral region, slight elevation of temperature, and a history of rapid emaciation and muscular weakness. The urine looked like rich milk, being perfectly opaque, with no tendency to precipitation. Its specific gravity was found to be 1.014, its reaction acid. After filtration approximately 2 per cent. of albumin was found present, but no sugar. Upon agitation with ether the urine became perfectly clear. Microscopic examination disclosed the presence of large quantities of finely divided fat-globules, chyle-corpuscles, and a considerable quantity of apparently broken-down matter. No casts were discovered, but there were a few blood-corpuscles. Examination of blood removed from the right ear at 12.30 A.M. disclosed the presence of embryonic filariæ. The patient was given two grains of methylene-blue at intervals of four hours, and on the following night the number of filariæ was found diminished, their movements sluggish, and their bodies, as well as the blood-plasma, to some extent stained blue. The urine lost its milky and turbid appearance, and became perfectly transparent, although deeply stained a characteristic greenish-blue. The treatment was then discontinued, but the urine became milky, and contained filariæ. The patient was again given methylene-blue, and three days later dead and partially disintegrated filariæ were found in the blood, deeply stained with blue. Treatment was discontinued at the expiration of five days, and no further symptoms appeared. Reference is made to the successful use of methylene-blue in the treatment of cases of gonorrhea, as well as malarial fever.

The Treatment of Whooping-cough with Cocain.—WELLS and CARRÉ (*Lancet*, No. 3745, p. 1429) report the treatment of 323 cases of whooping-cough during the autumn and early winter of 1894 with cocain hydrochlorate dissolved in water in doses (gr. $\frac{1}{10}$–gr. $\frac{1}{5}$) based on the standard of a one-grain dose for an adult, three or four times a day, by the mouth. Among the whole number there were two deaths, both in infants under six months of age—one from broncho-pneumonia, and one from persistent vomiting. In no case were evil effects observed. The only prominent manifestation was in some cases slight relaxation of the bowels. The average duration of the disease under this mode of treatment was about three weeks, and in mild cases about a fortnight or less.

For the Relief of Stings of Insects.—

℞.—Solution of ammonia . . 7 parts.
Collodion . . . . . 3 "
Salicylic acid . . . . . 0.3 part.

—*American Journal of Pharmacy.*

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SATURDAY, JULY 13, 1895.

DEMON-POSSESSION AND ALLIED THEMES.

"THE age of miracles is past" has become a proverb, but like all proverbs it is hardly half-truth. Miracles are occurring all the time if we had but the "eye of faith" to perceive them. In civilized communities they are unknown; they are unnecessary since the spread of the Gospel, say the orthodox—but other lands are more fortunate. China, for instance, still rejoices in them, in the form of genuine "simon-pure casting out of devils" by the humble possessors of the true light, according to the Rev. J. C. Nevins, D.D., whose 500-page volume is that of this article. Probably if we were blessed with the same degree of civilization as "The Flowery Kingdom," we should see similar wonders. Like the *ignis fatuus*, all they require is sufficient darkness to enable their light to be seen. The Reverend Dr. Nevins had no need to go to China in search of such marvels as his pages are filled with; the bottom-lands of Flat Crick and the gullies of the Great Smoky Mounting would have yielded an even richer trove of specimens to the expert miracle-stalker.

The book is a most extraordinary composition. Nothing but the evident sincerity and devoted philanthropy of its author, who gave his whole life to missionary work and literally died in the harness, would enable us to take it seriously. Going to China in early life a complete disbeliever in ghosts, "possession," etc., according to his own statement, he meets so many fearful and mysterious instances of demoniac opposition that he gradually becomes puzzled, and finally a complete believer in the supernatural character of these phenomena. He addresses circular-letters to many of his co-workers and finds them in different stages of the same conviction or bewilderment, and hence comes to the conclusion, "by the inductive of study of phenomena" (deliver us from our own terms!), that the same state of affairs obtains in China now as did in Judea at the dawn of Christianity (which is probably correct), and thereupon boldly proceeds to cast out devils himself and instructs his converts how to do so. He even mentions the particular passages of Scripture found most effective in the connection. He feels himself transported to the days of the Apostles, and refers complacently to the "intimate connection with the progress of Christianity in the neighborhood" of these feats. He declares that "from a large correspondence and personal acquaintance with missionaries in China . . . I have only known two who have expressed positive unbelief in the reality of these possessions."

A number of illustrative cases are given in support of this startling position, and then our "inductive investigator" proceeds to fill up the remaining four-fifths of his volume with chapters on remarkable instances of "Possession (of a most familiar order) in India," "in Christian Countries," "Evolution and other Theories," "Spiritualism," "Teachings of Scripture," and "The Literature of the Occult," etc.

The only original part of the book is the small portion of personal experiences and responses to a circular-letter, and is of a most disappointing nature. Beginning with a simple haunted house, which was rented very cheaply as a mission-station on that account, and then the demon driven out by holding evening-prayer, only, however, to enter another house in the near neighborhood. Of this the poor inhabitants not unnaturally complained and came with praiseworthy thriftiness to demand damages therefor from the native mission-teacher. The latter dignitary was equal to the emergency and proceeded at once to the house with a New Testament and a prayer printed on a large card. The

Testament was read, the woman affected promptly restored, the prayer posted on the walls as a preventive. The result, in Dr. Nevins' own words, was that "they were not troubled afterward, though the spirit was heard of trying to gain an entrance into other families in the neighborhood" (!). This is a fair sample of all that follows. Possession by "foxes," by badgers, by snakes (with which latter form we are only too familiar, and also with their evil spirit, whose mystic symbol is C_2H_6O), in Japan and India. The cases in "Christian lands" are even worse, plain hysteria, catalepsy, double personality, etc., some of them being actually quoted from Griesinger's *Mental Pathology*.

Spiritualism and theosophy are neatly brought into line of support and disposed of at the same stroke by being attributed to the activity of genuine evil spirits, to whom the mediums are "sold" in good old medieval style, while even "Dr. Jekyll and Mr. Hyde" and "Khalid" are dragged at the wheels of the argumentative chariot. Of course, the unspeakable W. T. Stead is not forgotten, and when anyone has to cite Mr. Stead as evidence it is a severe reflection upon the direness of his logical extremity.

In all seriousness and with a genuine respect for the author's devotion and evident sincerity, it seems wellnigh incredible that any man of his intelligence and education could extract the smallest atom of solid conviction from such a frothy mass of self-evident ghost-stories and fairy-tales, or could even relate them with seriousness.

The only way it can be accounted for is the influence of a life-long exposure to an atmosphere of belief in them. The instances in themselves are trivial, but the impressiveness of a vivid acceptance and dread of them by absolutely everyone by whom one is surrounded is overwhelming. Even Rudyard Kipling, that hard-headed Philistine of the twentieth century, has caught the infection and reveals traces of a belief that "other influences are at work in India," which is more than half genuine. The unconscious influence of environment is far greater than we imagine. How quickly one picks up the accent and idioms of a people by living among them, and habits of thought are wellnigh as infectious as habits of speech. There seems little doubt that constant association with the insane favors the development of eccentricities in their attendants, and even physicians. The moral tone of great criminal lawyers is said often to sink nearly to the level of that of their clients. And it would seem that even the missionary is unconsciously tinged by the heathenism among which he spends his life.

This work emphasizes a truth that has been growing in importance and recognition, that is, not only should our missionaries be medically educated, but they should have practical and clinical courses in mental diseases. A course of scientific study, however limited, would teach the differential diagnosis between "demon-possession" and mental abnormalism. Psychiatry kills superstition.

THE TREATMENT OF SNAKE-POISONING AND THE ESTABLISHMENT OF IMMUNITY BY MEANS OF THE BLOOD-SERUM OF IMMUNIZED ANIMALS.

THE question of the treatment of snake-poisoning has at different times engaged the brightest minds in medicine in clinical research and experimental investigation, with the hope of discovering an antidote for this fatal form of intoxication. A new impetus has been given the subject by the recent developments in connection with the treatment of infectious diseases by means of the blood-serum of animals rendered immune through gradually increased dosage with virulent cultures of the respective micro-organisms. In a line with these observations are the results of an experimental inquiry undertaken by Professor Fraser[1] and embodied in a communication presented at a recent meeting of the Royal Society of Edinburgh. This paper dealt with the consideration of methods for rendering animals immune to the venom of various poisonous snakes, and of the use of the serum of such animals for transmitting immunity and also of combatting the effects of snake-poisoning.

Having determined the lethal dose of the respective venoms for lower animals, these were treated with a succession of gradually increasing non-lethal doses, until the actual minimum lethal dose was determined. The treatment was then continued until a dose far in excess of the ordinary lethal dose was tolerated without serious reaction or injury on the part of the animals. So successful were the experiments that, notwithstanding the various natural difficulties, it was possible to give rabbits by subcutaneous injection as much as ten, twenty, thirty, and even fifty times the minimum lethal dose without causing obvious symptoms of poisoning, the only observable

[1] British Medical Journal, No. 1798, p. 1339.

phenomena being a rise in bodily temperature, continuing for a few hours, and loss of appetite, with decline in bodily weight. Not only was it possible thus to immunize animals against a specific venom, but it further appeared that animals thus immunized are capable of resisting the lethal action of other venoms, though in less degree. It was incidentally discovered that the protection thus conferred lasts for, at least, a considerable period of time, even when the last protective dose was not a large one. The explanation of these remarkable facts is believed to reside either in the production in the body by the influence of the venom of productive substances, or in the presence of these substances as an actual part of the venom itself, gradually accumulating with repeated administrations, whereas the lethal and toxic constituents of the venom are more rapidly destroyed or eliminated.

Having thus succeeded in inducing a high degree of protection in animals against the toxic effects of serpent's venom, the blood-serum of such immune animals was passed through a Chamberland filter and placed over sulphuric acid in the receiver of an air-pump. A perfectly dry and easily pulverizable solid was thus obtained, which could be kept unchanged for probably an indefinite length of time, and to which the name "antivenene" has been given. Four series of experiments were undertaken in which (*a*) the venom was mixed outside of the body with the antivenene, and the mixture injected under the skin of the animal; (*b*) the venom and the antivenene were injected almost simultaneously into opposite sides of the body; (*c*) the antivenene was injected a considerable time before the venom; (*d*) the antivenene was injected thirty minutes after the venom. The results of these experiments go to show that the blood-serum (antivenene) of animals protected against large doses of snake-venom is capable under varying conditions of administration of preventing lethal doses of the venom of the most poisonous serpents from producing death in non-protected animals. For the actual application of the antivenene to the treatment of snake-poisoning in man an endeavor is being made to obtain the large quantity that is requisite from a horse now receiving considerable lethal doses of cobra-venom, and from the same source it is hoped that a sufficient quantity will be obtained to allow of the examination of the chemic properties of the antivenene, with the object of discovering the constituents by which the antidotal effects are produced.

Results of a confirmatory character have been obtained by Dr. Calmette,[1] the head of the bacteriologic station at Saigon, China, whose methods were analogous to those of Professor Fraser. He, too, found that the venom of different animals is capable of conferring general immunity, though in varying degree. Rabbits rendered immune to snake-venom proved also resistant to abrin, while animals protected against abrin acquired a certain degree of immunity to snake-poisoning, diphtheria, ricin, and anthrax. In immunized animals injection of the venom is attended with hyperleukocytosis, while in untreated animals hypoleukocytosis develops. It was further discovered that snake-poison is rendered innocuous by admixture with a solution of calcium hydrochlorid or of gold chlorid.

The mortality from snake-poisoning in some parts of the world, notably in India and Australia, is very considerable, and a great saving of life must be effected by the conduct of Professor Fraser's investigation to a successful termination. We have here a further illustration of the yet not sufficiently recognized fact that the solution of no scientific problem is without practical bearing and utility. Even empiricism must have some sort of scientific basis, and the more strictly the practice conforms to the science the more permanent and successful will it be.

EDITORIAL COMMENTS.

The Treatment of Diphtheria with the Antitoxin.—Favorable reports of the use of the antitoxin in the treatment of diphtheria continue to be published, but it is observable that the latest are couched in cautious and conservative language. The data appear not yet sufficient for a final conclusion, but it cannot be denied that the preponderance of sentiment, as well as the weight of statistics, tends to sustain the hope held out as to the efficacy of the antitoxic serum.

One of the most interesting and important contributions to this subject has recently been made by LEICHTENSTERN and WENDELSTADT (*Münchener medicinische Wochenschrift*, 1895, No. 24, p. 553), in which they present the results of a careful analytic study of cases of diphtheria coming under observation during a series of years at the Augusta Hospital at Cologne. This article is to be commended for its judicial tone and for the dispassionate manner in which it deals with a subject concerning which much has been written within a short time, and even more enthusiasm has been displayed. While expressing themselves in favor of the utility of the new remedy, they point out its limitations and call attention to certain fallacious conclusions that have been reached without mature deliberation.

The study embraces a series of 123 cases treated with

[1] Vide British Medical Journal, p. 1339.

the antitoxin during 1894–95. With this they compare eleven series of similar numbers seen consecutively before, from 1892 to 1894. During the period preceding the use of the antitoxin the average mortality of all cases was 30.9 per cent. (with a minimum of 25 and a maximum of 39), while during the antitoxin-period it fell to 20.3 per cent.—a considerable reduction in the mortality.

During the antitoxin-period tracheotomy was required in 30 per cent. of the cases, with a mortality of 43.2 per cent., while in the previous periods operative interference was required in 32 per cent. of the cases (from 21 to 38.3 per cent.), with a mortality of 64 per cent. (from 56 to 76 per cent.). It is thus clear that while the use of the antitoxin exercised but little influence upon the proportion of cases in which tracheotomy was required, it caused a material reduction in the mortality among cases operated upon.

Among the 70 per cent. of cases not requiring operation during the antitoxin-period there were 10.4 per cent. of deaths, while among the 68 per cent. of similar cases (from 61 to 79 per cent.) seen previously, death occurred in 15 per cent. (from 9.2 to 27 per cent.). Both the proportion of cases in this group and the mortality were thus approximately the same, whether the antitoxin was used or not.

The net result of these figures is that the diminution in the mortality of cases of diphtheria treated with the antitoxin is attributable to the number of cases saved in which tracheotomy is required. Special attention is called to the fact that no evil results were observed from the use of the antitoxin, and the claim is sustained that the agent is totally innocuous.

The Treatment of Tetany with Thyroid Extract.—One cannot avoid being moved with admiration of the consecutiveness of the steps—so like the solution of a mathematic problem—by which was reached the conclusion that led to the employment of preparations of the thyroid gland in the treatment of myxedema and allied conditions; and the success that has been attained has quite opened a new field in therapeutics. Of the diseases related to or dependent upon disordered function of the so-called ductless glands we have much to learn, and such knowledge must surely bring enlarged therapeutic resources. Thyroid therapy has shown itself capable of a useful influence not only in myxedema and cretinism, but also in some cases of exophthalmic goiter, in some of akromegaly, and in some of psoriasis. To this list we may now add tetany, which, in some cases at least, further observation may show to be a thyroid disease. BRAMWELL (*British Medical Journal*, No. 1796, p. 1196) has made a number of interesting observations upon the employment of thyroid extract in the treatment of tetany. In the case of a patient in whom tetany had developed after removal of the thyroid gland, and who was being treated with small doses of thyroid extract, he advised that the remedy be pushed in much larger doses. In the course of a short time, the tetany and other symptoms disappeared and the patient made a rapid and complete recovery. Expression is given to the opinion that operative tetany is merely one manifestation of acute myxedema resulting from arrest of thyroid excretion, and of this opinion the experience reported is considered to be confirmatory. On another occasion, on being consulted about a boy of eight years, who had previously been under his observation for tetany, BRAMWELL advised the internal administration of thyroid extract, with the result that in the course of three weeks the improvement seemed "almost phenomenal." The attack had existed for nearly a year-and-a-half and had been variously treated with arsenic, chloral, antipyrin, bromid, cod-liver oil, etc. The child had had whooping-cough and influenza, and several months before the onset of the tetany had been knocked down by swinging jute. It has been pointed out that cold seems to aggravate tetany and to induce relapses, and that the disease is much more frequent in winter and spring than in summer and autumn, and these facts are viewed as denoting another important point of relationship between tetany and myxedema, for it has been shown also that cold predisposes to the production of myxedema. On account of the association of tetany in infants with rickets and laryngismus stridulus, it is further suggested that thyroid extract may also prove of therapeutic utility in these two conditions. Should this utility be demonstrated, the conclusion would be reasonable that these several disorders are attributable to a deficiency or a modification of the thyroid secretion.

The Index Medicus.—Every medical man interested in the welfare and progress of both his science and his art will have learned with deep regret of the unwillingness of Mr. George S. Davis to continue longer the publication of the *Index Medicus*. It now remains to be seen whether the profession will permit such an important, we may say indispensable, record of current literature to die or will unite in some concerted movement to sustain and carry on the great work. As a matter of fact, the duty really belongs to the government, but in default of such a satisfactory and logical disposition of the matter it devolves upon the medical body to advance the necessary means and provide the requisite support.

The subject is one that concerns not only the profession in America, but medical men throughout the world. In recognition of this fact the resident librarian of the Royal Medical and Chirurgical Society of London urges in the *British Medical Journal* scientific societies and scientific workers to subscribe to a fund for the continuance of the *Index*. He proposes that every English medical society should annually contribute at least two guineas for the support of the *Index*, and believes that sufficient could additionally be obtained from individual medical men to make an English guarantee-fund of not less than £400.

Dr. C. E. Sajous, of Philadelphia, sends from Paris to the editor of the *New York Medical Journal* twenty-five dollars, and suggests that two-hundred subscribers agree to contribute an equal sum annually. Mr. Davis has expressed himself in sympathy with this movement and offers to undertake the publication of the *Index* again, without profit or remuneration, provided a guarantee-fund be established that would secure him as publisher against loss. Should a surplus be realized it would be divided pro rata among the guarantors. We hope these efforts to save the *Index* will succeed beyond peradventure. The medical profession cannot afford to have them fail. We commend every one interested—and all should be—to communicate with Mr. Davis at Detroit.

Live-stock Sanitation in Pennsylvania.—Act No. 66, of the Pennsylvania Legislature, approved May 21, 1895, provides for a Live-stock Sanitary Board, whose purpose it shall be to endeavor to control and suppress "dangerous, contagious, or infectious diseases of domestic animals." The Board is to consist of the Governor, the Secretary of Agriculture, the State Dairy and Food Commissioner, and the State Veterinarian, and is empowered to enforce and regulate quarantine of animals, destroy them if deemed necessary, and regulate the movements of their products. The Board is authorized at any time to enter any premises, farms, fields, pens, abbatoirs, slaughter-houses, buildings, cars, or vessels where any domestic animal is at the time quartered, or wherever the carcass may be, for the purpose of examination. It shall also take such proper measures as may be deemed necessary for the protection of the milk-supplies from contamination. If this Board will carefully perform the duties with which it is charged, we may speedily hope to see a better milk-supply in this State, and perhaps some solution of the vexed question of the relation of tuberculosis in cattle to human tuberculosis.

The Number of Physicians and Surgeons in the United States.—According to the Bulletin on "occupations" of the eleventh census, just issued, there were in the United States, in the year 1890, 104,803 physicians and surgeons, or about 1 to every 600 of the population. The total number of wage-earners of all occupations is placed at 22,735,661. There were 89,630 lawyers, 88,295 clergymen, 58,090 nurses and midwives, 17,498 dentists, and 9900 undertakers.

SELECTION.

THE AMERICAN MEDICAL ASSOCIATION AND PATENT MEDICINES.

THERE is no doubt that the members of the medical profession, as a class, are opposed to patent medicines. The encouragement these remedies occasionally receive from physicians is usually due to carelessness or inexcusable ignorance.

The American Medical Association, at its May meeting in Baltimore, placed itself clearly on record in regard to this subject, and in a manner that is highly commendable. It involves a much-needed reform in the Association's journal, as is shown by the following extract from the report of the Board of Trustees concerning that journal:

"During the year no advertisements of secret remedies have been accepted that were not accompanied by a formula, but to still further comply with what appears to be the desire of a large number of those interested in the success of the *Journal*, the editor, with the termination of present contracts, has been instructed to accept no advertisements of medicinal preparations, the proprietors of which do not give a formula containing the official or chemic name and quantity of each composing ingredient to be inserted as a part of the advertisement."

This report was adopted with considerable enthusiasm, and we think the Board need not have used the guarded language it did by saying they proposed to "comply with what *appears* to be the desire of a *large* number," for the sentiment of those present not only *appeared* to be, but actually *was unanimous*.

As many of the advertisements in the above-mentioned journal, as well as in many other medical journals, have long been a standing disgrace to the profession they represent, we, more than a month after the meeting, made an examination of the advertising pages of the Association's *Journal*, but were unable to notice that any decided change had taken place. We, therefore, concluded that the advertisers' contracts had not expired.

There were, however, a number of advertisements in which the formulæ were given, and the conclusion was that their contracts had expired, or else they were preparing to renew.

Two of these formulæ were so unique, and at the same time so interesting, that we venture to enlighten our readers by reproducing them here, as follows:

"ANTIKAMNIA.

"*Formula.* A combination of coal-tar derivatives of the series C_nH_{2n-6}, into which the amines have entered, forming the various amido-compounds. Antikamnia has as its base the derivatives of the amido-benzoles, so combined as to obviate the bad effects caused by many of this series of organic bodies whem administered alone."

"CAMPHO-LYPTUS.

"*Composition.* Eucalyptol, campho-thymic acid, hydrous chloral."

No possible good can result from publishing such formulæ as these. They are simply ridiculous, and the *Journal of the American Medical Association*, by admitting them, lays itself open to the possibility of being considered the most "gullible" medical journal on the face of the earth.

There is no secret about the faculty necessary to decide what should be admitted. We could name a dozen members of the medical profession who possess that inborn knowledge which would enable them to decide almost in a moment on the admissibility of an advertisement. The result, however, would be such a "clean sweep" in the advertising pages of the Association's *Journal* as to be apparent to the most casual reader.

There is another lesson to be derived from these so-called formulæ. We have heard a great deal in the past few years about legislation to control the manufacture and sale of patent medicines, and nearly all of the suggestions are based on the publication of the formula on the label. But the experience of the American Medical Association shows us that it will be necessary to define whall shall constitute a formula.—*American Journal of Pharmacy*, July, 1895.

REVIEWS.

PERSONAL REMINISCENCES AND RECOLLECTIONS OF FORTY-SIX YEARS' MEMBERSHIP IN THE MEDICAL SOCIETY OF THE DISTRICT OF COLUMBIA. By SAMUEL C. BUSEY, M.D., LL.D., etc. 8vo., pp. 373. Washington, D. C., 1895.

THIS is the most interesting volume of medical *ana* that we have seen for a long time. The author tells us that he has not attempted to write an autobiography, but he was a conspicuous actor in many of the ethical con-

troversies which he describes, and incidentally gives a good deal, though not enough, of information about his own personality.

Beginning the study of medicine in 1845, in the old-fashioned way, by entering the office of an old-fashioned doctor, he learned enough in his first year to know that private pupilage in an office in Georgetown, without a book more recent than 1820, and with only two or three rusty scalpels and a pair of tooth-pulleykins, did not supply the opportunities he desired, and therefore in 1846 he came to Philadelphia and entered the office of George B. Wood as a private pupil.

His chapter on the life of a student of medicine in those days, including a description of the methods of Dr. Wood with his private pupils, contains some graphic pictures, and makes it clear that such pupils had to study. He commenced practice in Washington in 1848, and the old residents of that city must enjoy his description of the condition of things there at that time. There were but two streets that were even partly paved, garbage was thrown into the alleys, and swine were the privileged and protected public scavengers. To jostle against or drive over one of these municipal functionaries when out on his tour of sanitary inspection insured a cash penalty or brief servitude in the work-house.

A large part of the book is occupied with the history of the Medical Society of the District of Columbia, of which the author has twice been President. Special attention is called to the active part taken in the work of the society in its early days by medical officers of the army and navy. One chapter is devoted to the disturbances that arose in connection with the proposition, in 1869, to admit physicians of African descent to membership in the Medical Society, disturbances that extended to the American Medical Association, and that lasted for several years.

Another chapter treats of some of the effects of the rule of the Medical Society that its members shall not consult with physicians not members of the society, and of some of the trials for violations of ethics, of some members of the society. This will be curious reading fifty years hence. Dr. Busey says, "There remain some regulations which fall short of the more advanced conception of medical ethics. These, at least some of them, are, perhaps, justifiable, in view of the peculiar environments of the profession in the District of Columbia. The absence of a medical practice law makes it necessary to retain the limitation of consultation to membership, and to those, not members, to whom it has been legally extended by definite designation. The District of Columbia is now the common rendezvous of the impostors and charlatans driven from the States by the enactment of medical practice laws, and some sharp and incisive mark of distinction between such refugees, both of the itinerant and permanent class, has become of imperative necessity, as well for the protection of the community as for the maintenance of the honor and dignity of a scientific profession. The retention of a fee-bill schedule, with its minimum and maximum charges for every distinct and definite professional service, partakes too much of the ill-advised rules of trades unions, which demand the same wages for the incompetent as for the skilled artisan; offers protection to the ignorant, in that it holds his services equal in value to those of the learned and skilled, and invites a class of unfit men to sneak into a benevolent and scientific profession who could not earn a decent livelihood as ordinary mechanics. The regulation in regard to fees and consultations, as did the organization of the Medical Society in 1819, and Medical Association in 1833, grew out of the necessity of protection from the wrongs, injuries, and disreputable practices of the horde of irresponsible and ignorant charlatans that infested and desecrated the infant city; and it is probable they will be continued in operation as long as such protection and distinction are made obligatory by the failure of Congress to enact a suitable medical practice law."

Dr. Busey has made a substantial contribution to the history of medicine in this country, and his book should be of interest to all members of the medical profession.

THE TRANSACTIONS OF THE SIXTEENTH ANNUAL MEETING OF THE AMERICAN LARYNGOLOGICAL ASSOCIATION FOR THE YEAR 1894. New York: D. Appleton & Co., 1895.

THIS volume contains many valuable and instructive papers. Among those especially interesting is the paper by Dr. Jonathan Wright, of Brooklyn, on "Papillary Hypertrophy of the Nasal Mucous Membrane, Compared with a True Papilloma." This is of especial interest from a diagnostic and pathologic standpoint. The accompanying plates are clear and well defined. There is an interesting report by Dr. Charles M. Shields of a case of a foreign body (cocklebur) in the larynx and its removal intact by means of Schrötter's tube-forceps. Casselberry has an admirable paper showing the association of nasal polypus with ethmoiditis, and recommends treatment by resection of the middle turbinated body. French makes some valuable observations as to results in cutting operations on the nasal septum, showing that with proper care the healing process goes on rapidly; also that there is little danger of weakening the septum. The case of compound follicular odontoma reported by A. W. de Roaldes is interesting from a pathologic standpoint, as it is an extremely rare condition. The accompanying plates are instructive. Dr. Harrison Allen's paper, "Demonstrations of Skulls, Showing the Effect of Cretinism on the Shape of the Nasal Chambers," is one of the most valuable papers contributed.

ADDRESSES, PAPERS, AND DISCUSSIONS, SECTION ON SURGERY AND ANATOMY AT THE FORTY-EIGHTH ANNUAL MEETING OF THE AMERICAN MEDICAL ASSOCIATION, 1894.

THIS volume contains much of interest and value. John B. Roberts contributes an interesting paper, in which he combats the operative frenzy that has seized upon so many surgeons during the past few years. Wyeth discusses inoculations with septic or toxic agents in the treatment of malignant tumors, and concludes that sarcoma may be cured by septic infection. Allis contributes an able article in which he favors treating fractures of the lower end of the humerus in extension.

Amongst numerous interesting articles we note especially: Conner upon fractures of the lower end of the humerus; Deaver upon vesical tumors; Gaston on

anal fistula; Bonwill on the surgical engine; Belfield on prostatic enlargement; Lovett on the operative treatment of joint-tuberculosis; and Reginald Sayre on the conservative treatment of tuberculous joints.

The publication of these *Transactions* in a book small enough to be conveniently handled is commendable.

FORMULAIRE DES MÉDICAMENTS NOUVEAUX ET DES MÉDICATIONS NOUVELLES POUR 1895. Par H. BOCQUILLON-LIMOUSIN, pharmacien de 1re classe, lauréat (medéille d'or) de l'école de pharmacie de Paris. Introduction par le Dr. Huchard, médecin des hôpitaux. Sixième edition, 1 vol. in 18de 340 pages.

THE 1895 edition of this familiar work contains a large number of new articles, among which may be noted the following: Alangin, Alphol, Antipyonin, Bromethylformin, Cathartenic Acid, Chloralose, Cristallin, Diaphtol, Diiodoform, Ferratin, Glycozene, Iodoformin, Medicated Milks, Loretin, Lycetol, Menacin, Paraform, Resol, Salumin, Serotherapy, Pulmonary Juice, Tannal, Thioform, and Vasogene. There are also here contained a large number of colonial and exotic plants that have been recently introduced into therapeutics, and which have not, as yet, found place in any other formulary, however recent. The book is a valuable little aid to practical medicine up to date.

THE RETROSPECT OF MEDICINE. A Half-yearly Journal Containing a Retrospective View of Every Discovery and Practical Improvement in the Medical Sciences. Edited by JAMES BRAITHWAITE, M.D. Lond. Volume 110. July–December, 1894. (Issued January, 1895.) London: Simpkin, Marshall, Hamilton, Kent & Co., Limited. Edinburgh: Oliver & Boyd. Dublin: Hodges, Figgis & Co.; and Fannin & Co. Leeds: W. Brierly, Bond Street.

WE have only to repeat concerning the one-hundred-and-tenth volume of Braithwaite's Retrospect the good opinion we have uniformly expressed of its predecessors. The judgment exhibited in selection, the preservation of the exact language of the authors quoted, the good index, and the wide range of reading represented by the journals cited, render it one of the best books of reference to current literature in the market.

TEMPERATURE-CHART. Prepared by D. T. LAINÉ, M.D. Copyrighted by W. B. Saunders, Philadelphia.

THIS chart is evidently intended as a record for cases of fever treated with cold baths according to the method of Brand. Provision is made for thirty-two observations of temperature, pulse, and respiration in the course of twenty-four hours, as well as for notes upon the excretion of urine, the evacuation of the bowels, the amount of food, and other matters that may be considered important or interesting. Upon the reverse side of the sheet is a description of the method of Brand for the treatment of typhoid fever.

THE YEAR-BOOK OF TREATMENT FOR 1895. A Critical Review for Practitioners of Medicine and Surgery. Octavo, pp. 490. Philadelphia: Lea Brothers & Co., 1895.

THIS issue of the *Year-book* maintains the reputation established by previous issues. Its contents naturally do not include everything new that has developed during the past year, but the attempt has been made to select that which is practical and promises to be of permanent value, and omit that which appears unimportant. The work has been done by twenty-three contributors whose names are well known in English medical literature. The name of the editor, however, does not appear.

ATLAS UND GRUNDRISS DER OPHTHALMOSKOPIE UND OPHTHALMOSKOPISCHEN DIAGNOSTIK. Mit 5 Text und 102 Farbigen Abbildungen auf 64 Tafeln. Von DR. O. HAAB, Professor an der Universität und Direktor der Augenklinik in Zürich. München, 1895. Verlag von J. F. Lehmann.

THIS excellent manual of ophthalmoscopic pictures will be welcomed by all ophthalmologists, by reason of the convenient size of the book, and because of the large number of capital illustrations of typical diseases of the eye-ground. An introduction treating of ophthalmoscopy is noteworthy, and a page of explanatory text accompanies each plate.

SOCIETY PROCEEDINGS.

AMERICAN LARYNGOLOGICAL ASSOCIATION.

Seventeenth Annual Meeting, held at Rochester, N. Y., June 17, 18, and 19, 1895.

FIRST DAY—JUNE 17TH.

DR. JOHN O. ROE delivered the President's Address, the subject of which was

THE RELATION OF DAMP AIR TO DISEASES OF THE UPPER AIR-PASSAGES, ESPECIALLY IN THE LAKE REGION.

He pointed out that no one region is good for all ailments. That beneficial for respiratory affections is generally bad for biliary troubles, and *vice versa*. The effect of any climate is due partly to its direct influence on internal organs and partly to its indirect influence upon the habits of the individual. In the Lake region diseases of the air-passages are very common, while the biliary disorders are comparatively infrequent. The region is characterized by great humidity, with sudden temperature-variations and a low mean animal temperature.

The amount of watery vapor in the atmosphere depends largely on the soil. It is relatively small where the soil is sandy and porous and drains quickly, even after heavy rainfalls; and it is relatively large where the soil is heavy, with an underlying stratum of clay. In the Lake region both soils are found. Cultivated soil signifies less moisture than uncultivated. The Lake region soil is highly cultivated and in so far beneficial in reducing the atmospheric humidity. The temperature is affected by the cold air that sweeps down from the great lakes. The changes of temperature are frequent and rapid. The early warm days of spring are followed by chilling blasts from the North. The amount of cloudiness is considerable, averaging six-and-one-tenth days out of ten for the past twenty-five years. The average

rainfall of the Rochester district is 27 inches, the mean annual temperature 40°. Other localities possessing the same general characteristics may be free from the cold-air currents and thus present a very different resulting climatic condition.

Damp air is injurious to the body in that it checks insensible perspiration, and hence there result endosmosis through the mucous membrane and a checking of elimination, both of which lead to turgescence, hyperemia, and hypernutrition. The nose bears the brunt of this bad influence, owing to both its direct exposure and its normally abundant vascular supply.

A peculiarly pernicious habit is that of sleeping in cold weather with the window wide open. The body is subjected to the influence of damp air at a time when its natural reactionary resistance is low, and the patient sleeps in a temperature that would be undesirable if he were awake. Hence we have that frequent naso-pharyngeal tumescence, with its characteristic symptom-group, known as the "American Disease."

We must learn to drain our lands and houses thoroughly and how properly to ventilate our sleeping-rooms.

DR. E. FLETCHER INGALS, of Chicago, read a paper on

DESICCATED THYROIDS IN GOITER.

He related that during the past fifteen years he has treated eighty-one cases of bronchocele and exophthalmic goiter. He gave potassium iodid thrice daily in doses of from five to ten grains. If no improvement resulted in two or three weeks, he gave tincture of iodin in doses of from five to twenty-five drops in capsule, followed by a large draft of water, or, in connection with this, injections of from 3 to 5 per cent. solution of carbolic acid in glycerin and water, from twenty to fifty minims being injected once a week.

For the past four years he has used the thyroid preparations and the desiccated preparations in his last six cases of goiter. Six grains of this represent one entire gland. All of his cases, except one, are still under treatment, and had been previously treated according to the old method. In addition, Dr. Ingals has obtained reports of forty-four cases treated by other physicians. Of one series of twenty-five, all but seven were improved. The neck was reduced in size, but the remedy seemed to cause headache in 30 per cent., dizziness in 37 per cent., and increasing rapidity of the pulse in 25 per cent. Out of the whole number of fifty cases the size of the neck was reduced in thirty-eight. Out of seven cases of myxedema improvement was noted in five. In addition to the unpleasant symptoms noted previously, there have also been observed trembling, backache, weakness, nausea, loss of weight, and in one instance uterine contractions.

Dr. Ingals summarized his conclusions as follows:

1. Thyroid preparations show powerful physiologic effects on the nervous and circulatory systems. These symptoms result from the daily use of from one-and-one-half to two glands, and there is reason to believe that too large quantities might produce fatal results.

2. The desiccated preparations are best. Internal use yields as good results as does hypodermic injection, and the initial dosage of the preparations should be two grains, which may gradually be increased to eight.

3. The effect on bodily weight is uncertain, varying not only in different patients, but also at different times in the same individual. Alleged disturbances from the remedy may be due to incidental digestive disorders.

4. The remedy is useful in myxedema.

5. In non-exophthalmic cases the cardiac condition is sometimes aggravated rather than relieved. Cystic conditions are not affected.

6. Outside of the foregoing conditions there is none in which thyroid therapy promises any good results.

In discussing this paper, DR. E. L. SHURLY, of Detroit, expressed disappointment at his own results in some eighteen or twenty cases subjected to thyroid treatment. He mentioned the case of a boy from whose neck a large thyroid was removed by operation. The patient seemed to develop somewhat, but did not grow in size, and three or four years later he was mentally apathetic and had a peculiar piping voice. Laryngeal examination showed normal movement of the arytenoids and the bones, but the latter did not assume the normal tension in phonation. Thyroid feeding for two years improved the throat-condition, though previous hypodermic use of the remedy had been without effect. He would condemn the total extirpation of the gland in view of the bad condition that may follow such a radical procedure. The leaving of a small portion seemed to prevent such an untoward result.

DR. W. E. CASSELBERRY, of Chicago, had treated one case of exophthalmic goiter with fresh thyroid gland, with improvement, but not cure. He alluded to a recent paper by Paul Bruns, who had found that the younger the patient the better the result. Thus of the cases in the first decade of life all were cured; in the second decade, 75 per cent. were cured; but after this age the results were less satisfactory, and after the fortieth year decidedly unsatisfactory.

DR. INGALS, in closing, said that the drinking of distilled water should be insisted upon in this disease, as bad water seemed to be in many instances the distinct etiologic factor.

DR. W. E. CASSELBERRY read a paper on

ELECTROLYSIS BY A CURRENT-CONTROLLER FOR THE REDUCTION OF SPURS OF THE NASAL SEPTUM,

and described a special apparatus to be used with the Edison (continuous) current. The ideal electrolytic current should be one of moderately high tension (voltage) He employed the bipolar method in *séances* of from six and of comparatively low current-strength (ampèrage). to eight minutes and with from fifteen to forty milliampères. His needles were made of irido-platinum. His personal experience consisted of ten cases, which, for this purpose, he divided into three types:

1. Strictly cartilaginous spurs. These can be removed by electrolysis, but the method is more tedious and less brilliant than other procedures. It is free from hemorrhage, but is not a universal substitute for time-honored surgical methods.

2. Spurs made up of both cartilage and bone. These will reduce in size in proportion to the amount of cartilaginous element present.

3. Spurs wholly bony. These cannot be reduced by electrolysis. Needles will not penetrate them, and the process will not resolve bone.

4. Deviations cannot be remedied by this method.

DR. W. H. DALY, of Pittsburg, condemned electrolysis as a mere theory rather than a fact. He prefers the usual surgical procedures, especially the trephine driven by the De Vilbiss motor. He contended that Dr. Casselberry's apparatus, moreover, could not be used with the customary alternating current.

DR. JONATHAN WRIGHT, of Brooklyn, thought the method had a field of usefulness in cases in which pulmonary tuberculosis or other debilitating condition was present and a serious result might follow the usual surgical methods.

DR. INGALS said that the soft anterior septal spurs could be removed by the galvano-cautery point heated to whiteness.

DR. S. HARTWELL CHAPMAN, of New Haven, thought Dr. Casselberry's apparatus faulty in that it did not subdivide the current finely enough to prevent shock when used in the nose.

DR. A. B. THRASHER, of Cincinnati, inquired if the bipolar method was less painful than the monopolar.

DR. CASSELBERRY replied that it was. He admitted the force of Dr. Chapman's criticism and hoped to remedy this defect of his apparatus.

DR. GEORGE B. HOPE, of New York, read by title a paper entitled

IS ACUTE TONSILLITIS IN ANY WAY DEPENDENT ON THE RHEUMATIC STATE?

He took the ground that the theory of acute tonsillitis being very generally attributable to an underlying rheumatic or gouty diathesis has not been substantiated by clinical observation. It was contended that patients subject to attacks of tonsillitis do not commonly give a history of rheumatism, proximate or remote, and that, on the other hand, the rheumatic individual rarely suffers from tonsillar inflammations. It is noteworthy that in later life the tonsils become less and less disposed to acute attacks, while the rheumatic tendency becomes more confirmed. Moreover, as a local acute manifestation, rheumatism selects a sero-fibrous rather than a muco-fibrous or lymphatic structure, as the tonsil. It was also maintained that suppurative peri-tonsillitis is clearly infectious and frequently a sequel of intranasal operations.

The conclusion was reached that the favorite anti-rheumatic treatment, as guaiac or the salicylates, addressed to the condition is either erroneous in practice or acts independently and by methods not clearly understood. Such remedies should not be considered specifics, but should be used in accordance with the varying conditions of the subject. Moreover, it has not been proved that the treatment does abort or mitigate the course of the disease.

Various new instruments were then exhibited by members of the Association, and the following papers were read by title:

FOREIGN BODIES IN THE ESOPHAGUS,

by DR. HARRISON ALLEN, of Philadelphia;

THE INFLUENCE OF CHRONIC DISEASES OF THE THROAT UPON CERTAIN DEFECTS OF SPEECH,

by DR. D. BRYSON DELAVAN, of New York.

SECOND DAY—JUNE 18TH.

DR. JOHN A. FARLOW, of Boston, reported

TWO CASES OF LIPOMA.

One was in a boy, aged two years, who presented a lipoma of the inner side of the right cheek. Nothing had been noticed till one day the child seemed to have a little blood in his mouth. Examination showed a reddish lobulated growth, soft and movable, looking like parotid glandular tissue, and pedunculated, just opposite the mouth of Stenon's duct. Removal was effected with the cold-wire snare, and was unattended with hemorrhage. The second case occurred in a man, aged sixty-six years, who had had a tumor in his mouth for fifteen years. Seven years previously a "piece was removed with scissors." When first seen the man presented a mass in the front part of the mouth, but evidently attached a good ways back. He was obliged to wrap a piece of cloth around it and hold it away from the teeth to prevent injuring it. Suffocative attacks occurred from a piece of the mass falling down between the vocal bands into the trachea. With the cold-wire snare and scissors quite a large piece was removed. The patient was then lost sight of, but returned a year or so later with recurrence of the growth and return of the former symptoms. With the galvano-cautery snare the entire mass, which was just above and in front of the right arytenoid, was now removed.

DR. FARLOW made

SOME REMARKS ON THE REMOVAL OF THE TONSILS,

dealing with the choice of operative methods. It is necessary first to break up adhesions between the faucial pillars. Then if there are present the usual large projecting tonsils of childhood, with adenoids in the vault, anesthesia should be secured, the tonsils removed with the cold-wire écraseur, and the adenoids taken out. All this would be easy enough if large tonsils always occurred in large mouths. Unfortunately, however, they frequently occur in small mouths with narrow jaws. A special instrument was exhibited which is a modification of Hooper's snare, having a straight canula and a reinforcement of weak points. The wire is the usual No. 5 or No. 7 piano-wire. The tonsil should be pushed out from its bed by external pressure, and can, as a rule, be very quickly removed. Cocain is applied if no adenoids are to be removed, and ice is used freely after the operation.

Dr. Farlow has also had good results with Ruault's punch-forceps, though they seem very large and clumsy, and their use occasions some pain; also with Hartmann's conchotome, though it was devised for intranasal work. The latter is especially serviceable in getting out the deep-seated tonsillar tissue high up between the faucial pillars. He also uses small curved knives to cut up the surface of the tonsil so as to render the tissue available for seizing with the forceps. The galvano-cautery he has found very tedious.

In discussing the paper, DR. F. H. BOSWORTH, of New York, said that the more we regarded the tonsil as only diseased tissue the more rational would be our treatment of these cases. He had learned to expect possible bleeding whenever he cut into lymphoid tissue. In children this did not occur. Large rounded tonsils

could easily be guillotined, but the removal of those spread out, and with adhesions to the faucial pillars, was a more difficult matter. These must be dug out, and no one instrument will answer for every case.

DR. INGALS had seen bleeding from small tonsils whose removal seemed indicated, but which were not large at the time of operation. Cocain did not anesthetize to any great extent, and it did promote bleeding.

DR. CARL SEILER, of Philadelphia, alluded to the canalization of the vessels in the indurated tissue as a cause of bleeding. He believed that the long diameter of the tonsils was horizontal rather than vertical, a fact overlooked by our instrument-makers.

DR. J. C. MULHALL, of St. Louis, laid stress upon the necessity of breaking up all adhesions between the faucial pillars.

DR. DALY thought that more bad surgery had been done on the tonsils than on any other part of the body. They form no part of the normal throat. The ordinary Mackenzie tonsillotome only partially accomplishes the desired result. We must finish by trimming with the knife and forceps. He had had four or five cases of alarming hemorrhage.

DR. CASSELBERRY believed that children do bleed severely at times, and whenever removing the tonsils with the guillotine always has a reliable galvano-cautery ready to use if hemorrhage occurs. It is difficult to separate the pillars, but if he can get the muscular element of the latter free he does not mind if he sacrifices a little mucous membrane.

DR. SHURLY thought that in every case we should first form an idea of the nature of the tonsils and the amount to be removed. We may have bleeding from an abnormal distribution of arterial twigs. In using ignipuncture he does not put the point of the cautery directly into the crypts, but burns diagonally across them, including the lymph-spaces. He endeavors to substitute an acute inflammation for an old proliferative process. He differed decidedly from Dr. Seiler as to the direction of the greatest diameter of the tonsil.

DR. BOSWORTH, of New York, reported a case of

MELANCHOLIA CURED BY INTRANASAL OPERATION.

It occurred in a man, aged forty-two years, who suffered from depressive melancholia, at first periodic, but later constant, and became unfitted for business. He complained of the eyeballs feeling as if too large for the sockets, and of a bursting pain between the eyes. He had at different times been operated on for varicocele, stricture, ligation of the pudic artery, removal of the testicles, and hemorrhoids. He had worn glasses, had his eye-muscles cut, and one eye enucleated. He had been circumcised, had his spine cauterized, and worn a seton in his neck. Examination of the nose showed the right nostril nearly occluded by a thickened bulging of the cartilaginous septum and the left middle turbinate thickened, with myxomatous degeneration, and evidences of ethmoid disease. The nostrils were freed with saw and snare, and all symptoms quickly disappeared. The man has since remained perfectly well.

DR. BOSWORTH also reported

A CASE OF SUPPURATIVE ETHMOID DISEASE, FOLLOWED BY INVASION OF THE SPHENOIDAL SINUS, ABSCESS OF THE BRAIN, AND DEATH.

A dentist, aged thirty-three years, suffered from an offensive discharge from the left nostril, and later from the right, with severe headache and neuralgia of the left side of the head, without fever. Pus flowed down between the left middle turbinate and the septum. A diagnosis of old ethmoid disease with probably recent involvement of the sphenoid sinus was made. Free drainage was established with a sharp gouge, and for six days marked improvement of all symptoms was noted. Later they grew worse, and with a three-sixteenth-inch burr an attempt was made to penetrate the sphenoid, though it was not possible to say whether or not the sinus was actually entered. On the following day a chill occurred, with a temperature of 106°, the development of semicoma, and paralysis of the left arm and face. A second rigor occurred, and was followed by death. No autopsy was held, but it was thought that death was due to a brain-abscess. The lesson of this case was that, while ethmoid disease is not directly dangerous as a rule, it may become so indirectly. Dr. Bosworth believes that most of the so-called sphenoid disease is really ethmoid. He has seen one-hundred-and-fifty cases of the latter, but only two of the former, and both were fatal.

DR. J. H. BRYAN, of Washington, presented

A FURTHER CONTRIBUTION TO THE STUDY OF SUPPURATIVE DISEASE OF THE ACCESSORY SINUS.

He reported cases of abscess of the right maxillary sinus resulting from dental caries; suppurative ethmoiditis terminating in caries of the anterior ethmoidal cells; abscess of the left frontal sinus resulting from nasal polypi and hypertrophic rhinitis; and abscess of the frontal, ethmoidal, and maxillary sinuses, with caries of the fronto-ethmoidal cells. The last was especially interesting, inasmuch as a communication existed between the frontal sinus and the antrum. It was uncertain whether this was the result of disease or an anatomic anomaly. The condition has been found a few times in the dissecting-room.

DR. WRIGHT related the history of a case of antrum-disease in which it was impossible to discover the origin of the pus. He would condemn too early operation in this class of cases.

DR. INGALS thought the best way to open the sphenoid sinus was from below rather than anteriorly. This it was possible to do with an instrument used by dentists, in which the revolving drill worked at right-angles to the shaft of the instrument.

DR. GLEITSMANN preferred to open the sinus with a Schaeffer's probe passed four-and-one-half inches upward along the side of the middle turbinate, about one-eighth of an inch below its lower border.

DR. SHURLY had seen many cases of nasal discharge which he had thought due to neuritis, secondary to organic disease of the brain, which had affected the olfactory bulbs.

DR. DALY thought it preferable to slit up one side of the nose and lay it over on the face. In this way we could reach the sphenoid sinus more easily and much more safely.

DR. MULHALL thought that the brain was better protected from injury in the sphenoid region than in the ethmoid. Sphenoid disease apart from ethmoid he believed to be rare.

DR. THRASHER related a case somewhat similar to Dr. Bosworth's case of melancholia relieved by intranasal operation.

DR. W. K. SIMPSON, of New York, read a paper entitled

A CONSIDERATION OF SOME OF THE MORE IMPORTANT PRINCIPLES OF INTRANASAL SURGERY.

He said that the more accurately we could apply surgical principles to the treatment of nasal disease the greater would be our success. Conservative surgery might be defined as "knowing when not to interfere." We make mistakes occasionally, but they should serve as landmarks to guard against further error. He spoke particularly of the treatment of obstructive and hypertrophic rhinitis. The nose has a natural protective influence, and there is a pre-surgical or pre-operative period, during which we should do all we can by diet, clothing, habits, and a regulation of the general environment. In cases with a tendency to atrophy we should be very cautious about operating, and if we did operate we should endeavor to leave perfect symmetry and a smooth surface, with as little destruction of tissue as possible, and the least possible shock, hemorrhage, and danger of septic infection. The operation-wound should be treated as antiseptically as possible. Nasal surgeons are prone to be careless in minor details. Especial care should be taken to keep the left thumb and forefinger clean, as with these we wrap the cotton that goes on the applicator into the nose. Much of the "grippe," "severe cold," etc., after operation is nothing but mild sepsis.

DR. MULHALL believed that if we would use the cautery at a white heat and never allow it to cool *in situ* we would have no bad after-effects. He used a saturated solution of sodium bicarbonate to neutralize the effects of the radiated heat on the nasal mucosa.

DR. JAMES E. NEWCOMB, of New York, read a paper on

LUDWIG'S ANGINA,

which is generally defined by modern writers as a diffuse phlegmonous inflammation of the floor of the mouth and of the intermuscular and subcutaneous cellular tissue of the submaxillary region. The specific identity of the affection has always been a disputed point. Ludwig gave as its characteristic features: 1. A peculiar wooden induration of the tissues which does not receive impressions. 2. A uniform spread of this induration in such a way that it is always sharply bordered by a zone of entirely unaffected cellular tissue. 3. A hard, sublingual swelling, with a bolster-like mass around the interior of the lower jaw, of a deep-red or a bluish-red color.

It is impossible to harmonize the various conflicting statements, but it seems fair to regard the disease as an intensely infectious phlegmon, occurring under peculiar anatomic conditions. No pathognomonic germ has ever been discovered, only the ordinary bacteria of suppuration. Fatal cases show a general tissue-disorganization, with sloughs, ichor, or offensive pus.

Predisposing causes favoring the entrance of infection are dental eruption and caries, tonsillitis, disease of the buccal glands, and labial herpes. Cold, so frequently invoked as an exciting cause, is often but an undeterminable infection.

In the true Ludwig's disease the pus originates in a pyramidal space, the apex of which, situated below, corresponds to the point where the mylo-hyoid muscle borders the genio-glossus, and the base of which, situated above, stretches along under the tongue. The internal face of the inferior maxilla and the mylo-hyoid muscle form its external (oblique) wall, and the genio-glossus and mylo-glossus its internal (vertical) wall. The germs first invading the sublingual may also penetrate the submaxillary sheath, or the latter may be attacked by the sublingual pus which has disassociated the fibers of the mylo-hyoid muscle.

The local and general symptoms are those of pus-formation, with subsequent pressure on surrounding parts. Special stress is laid upon the appearance at the inner aspect of the dental arcade of a pad or button-like area of induration. A differential diagnosis must be made from simple submaxillary adeno-phlegmon, osteomyelitis of the jaw, and Fleischmann's hygroma.

Statistics of 58 cases are sufficiently accurate for analysis. Of these 44 occurred in males, 9 in females, and 5 in infants whose sex was not stated. The maximum age was sixty-six years, and the minimum three months; 40 per cent. occurred between the ages of twenty and thirty years. Recovery is noted in 33 and death in 25. Bacteriologic findings in 9 instances were: Cocci of erysipelas, 2; streptococcus pyogenes, 4; staphylococcus pyogenes aureus, 1; and albus, 1. In one instance there was found a bacillus a little longer and narrower that the B. coli communis, but distinguishable from the latter by culture-reactions.

Treatment may be summed up as early incision, subsequent rigid antisepsis, and general support.

Very recently Semon has advanced the proposition that this malady and acute edema of the larynx, edematous laryngitis, phlegmonous pharyngitis, and pharyngeal erysipelas are all but different varieties of septic inflammation of the throat, differing only in localization and grade of severity, but all having the same general etiology. He maintains that this view constitutes a simple clinical application of bacteriologic principles to this group of septic inflammations.

DR. H. P. SWAIN, of New Haven, thought that some cases of peritonsillar suppuration of the lingual tonsil gave a symptom-group very much like that described.

A discussion on

TUBERCULOSIS OF THE UPPER AIR PASSAGES

was opened by DR. JONATHAN WRIGHT, of Brooklyn, who spoke of the etiology. Recent advances in bacteriologic knowledge have led us to modify greatly the postulates of Koch. We now know that bacteria can penetrate epithelial surfaces. Some of them are destroyed by phagocytosis and others by the fibroid induration that they themselves excite. It is believed that tuberculous infection can take place through the adenoid tissue at the base of the tongue, but it is conjectural whether the bacilli are actually found in the tissue itself or in the papillæ.

Much of our experimentation on animals is not in exact accord with the actual problems of clinical medicine, and we cannot reason directly from the results that follow the injection of tuberculous material into the bodies of animals by means of the syringe. All of us receive some tubercle-bacilli. Autopsies show evidences of arrested tuberculosis in one out of every two or three

bodies examined. The fatality is due not so much to the bacillus as to the bad general environment in which people live. Physicians come in contact with the bacillus daily, and yet the death-rate among them from pulmonary tuberculosis is not high. The bacillus alone is not enough to cause the disease.

As to laryngeal infection, the old corrosive-sputa theory of Louis has been abandoned. As to its frequency we are somewhat uncertain, for in pulmonary tuberculosis the larynx is often not examined; thus many lesions escape observation, and in many tuberculous ulcers are seen only when the patient is *in extremis*. Pyogenic cocci first make a breach in the epithelium, and then the bacillus enters. The bacillus itself cannot cause an abscess. Infection through glandular epithelium is a matter of dispute. There seems to be a wavy arrangement of the epithelium in the larynx that allows of its stretching during vocal effort, so that its protective influence is continuous. Lesions of the pharynx generally occur late in the disease or with acute miliary tuberculosis; nasal lesions generally at the end of pulmonary disease.

DR. C. C. RICE, of New York, presented a paper on

DIAGNOSIS.

Nasal Tuberculosis. Willigk found only one instance among 476 autopsies. It may occur either as an ulceration of the septum and floor of the nose, or as small papillary outgrowths, generally from the turbinates. It is doubtless frequently overlooked or it may coexist with specific septal disease. Nasal ulceration, with concomitant lung-disease, not yielding to potassium iodid, should awaken suspicion.

Tuberculosis of the Pharynx and Larynx. One case of the former and 237 of the latter were found in Willigk's series of 1307. Dr. Rice believed that faucial tuberculosis was associated more generally with acute miliary tuberculosis than with the usual chronic disease of the lungs. It may appear in the soft palate before it undergoes ulceration, but probably all parts of the system are invaded at the same time.

Tuberculosis of the Larynx. Eighty per cent. of all cases can be easily recognized. Of the remainder perhaps one-half require the microscope and administration of potassium iodid to determine definitely their nature. Unusually we have the typical semi-edematous, semi-inflamed conditions of the tuberculous infiltrations and the surface-ulceration, with its "moth-eaten" look. Such lesions are generally symmetrical and are situated upon an anemic base.

In incipient tuberculosis we find localized anemias of the hard and soft palate in throats otherwise healthy, and this with enlarged capillaries converging from the different portions of the palate toward the uvula. In addition we have elevation of the papillary layer in the inter-arytenoid commissure and feeble action of the internal laryngeal abductors. Dr. Rice regards recurring papilloma of the vocal bands as a suspicious circumstance, pointing toward tuberculosis. Arytenoid congestion or the slightest appearance of bogginess should also put us on our guard.

Then, finally, are the irregular cases with the frequent coexistence of syphilis and tubercle, or syphilis in the larynx and tubercle in the lungs. Rarely do we have with tubercle what is common enough with specific disease—adhesive inflammation between the anterior portions of the vocal bands. We may also have: 1. Granular hyperplasias or ordinary granulation-tissue. 2. The frequently seen inter-arytenoid water-like excrescences closely allied to papilloma of the larynx. 3. Small rounded tuberculoma beneath the mucosa, found to consist of true tubercle-tissue usually containing bacilli.

DR. SHURLY spoke of the

MEDICINAL TREATMENT.

He doubted whether much of the alleged post-mortem evidence of tuberculosis was entitled to credence. We may have "phthisis" without tuberculosis. The treatment is either local or general. Locally iodoform has given the speaker the best results. He uses ice freely. Climate and rest of voice were insisted upon. To modify pharyngeal and laryngeal ulceration chlorin gas, sodium formate, and iodoform are the most serviceable. As a specific plan iodin with gold and sodium chlorid has given good results; also oil of cloves and oil of castor. Gavage will enable the system to withstand the ravages of the disease and will also lower the temperature. We should never give meat-extracts alone, but always combined with vegetable foods in the form of gruel, which can be passed through a tube (sago, tapioca, etc.). Alcohol is generally too irritative for cases of laryngeal tuberculosis. Locally a mixture of eucalyptus, morphin, and cocain will greatly relieve pain. Tracheotomy is useless. So also in his hands were scarifying and curetting.

DR. J. W. GLEITSMANN, of New York, considered the

SURGICAL TREATMENT.

He considered curettement with the single or double instrument. Surgical treatment is, broadly speaking, either endo-laryngeal or extra-laryngeal. The former includes incision with knife or scissors, curettement, submucous injection, electrolysis, or the galvano-cautery; the latter, laryngotomy, with excision of diseased parts, extirpation of the larynx, and tracheotomy.

Dr. Gleitsmann has found on record eight total and seven partial extirpations of the larynx for tuberculous disease. In four of the cases of total laryngectomy the diagnosis was made before operation; in two the operation was performed on account of lupus and two had been considered carcinomatous; of the cases of partial laryngectomy, the operation was performed in five for tuberculosis, in one for lupus, and in one for supposed carcinoma.

Only six out of some seventy authors consulted speak disparagingly of curettement. It cannot, of course, exert a favorable influence on concomitant lung-disease, but we are justified in calling a case cured when, even if the lung-process continue, the laryngeal symptoms subside, the larynx looks normal, and no trace of the disease is found post mortem.

Contraindications are advanced lung-disease and hectic, disseminated laryngeal tuberculosis, leaving little or no area of healthy tissue, and extensive infiltration producing stenosis. Under the latter conditions tracheotomy is indicated. The claim made that curettement hastens the pulmonary disease is not supported. Hemorrhage, which, in any considerable amount is rare, can be checked by a mixture of lactic acid and ferric-

chlorid solution. Pain is avoided by the repeated use of strong solutions of cocain.

Curettement is analogous to the excision of a tuberculous joint. It removes a focus of infection which is a constant drain on a weakened system, and is in properly selected cases the best procedure at our command. The double curet will often remove at one setting the arytenoid infiltration, which is the great cause of dyspnea. Such procedure also lessens pain, through its removal of the abundant nerve-proliferation. The indications are as follows:

1. Primary tuberculous disease without lung-complication.

2. Cases with concomitant lung-disease, either incipient or which has stopped short of softening or hectic.

3. Especially circumscribed ulcerations and infiltrations.

4. Dense, hard swelling of the arytenoid region, ventricular band, posterior wall, tuberculous tumors, and affections of the epiglottis.

5. In advanced lung-disease with distressing dysphagia from arytenoid infiltration.

Heryng's single curets are best suited for cleaning and scraping ulcerations, and Krause's double curets and Heryng's rotary curets for excision of tuberculous infiltrations. Subglottic lesions can be operated upon with Scheinmann's forceps, and with laterally bent forceps an attempt may be made to reach the ventricles. Post-operative quiet is absolutely necessary. Lactic acid or pyoktanin, 1 or 2 per cent., should be applied daily until cicatrization is complete. The latter process occurs in from one to five weeks. Well-defined ulcerations do better than shallow and extensive ones; dense infiltrations, which are generally localized, better than edematous conditions.

Dr. Gleitsmann's own cases numbered twelve, all with lung-complications. Two operations were for infiltration of the posterior wall alone; one for such infiltration with affection of the ventricular band combined; four arytenoidectomies; three arytenoidectomies, and excision of the ventricular band; and two of the latter alone. Arytenoidectomy had to be performed twice on each of the ten patients on account of recurring infiltration. One patient died from heart-failure, and another from advanced lung-disease. Four are without recurrence of laryngeal disease from six to ten months. One of these had an affection of the posterior wall, another of the ventricular band, and two of the arytenoid region.

(To be concluded.)

NEWS ITEMS.

The Examinations of the Illinois State Board of Health.—The following preamble and resolution were unanimously adopted by the Illinois State Board of Health at a meeting held at Chicago on June 25, 1895:

Whereas, The faculty of the Northwestern University Woman's Medical College adopted a set of resolutions criticising the Illinois State Board of Health for having issued to three non-graduate students of said college the State certificate entitling them to practise medicine, whom they claim were not entitled to receive them, and charging the Board with having adopted a lax policy in numerous other instances, thereby seriously detracting from the usefulness of the Board; and

Whereas, Although the resolutions were "ordered to be placed before the Illinois State Board of Health," they were furnished to the various medical publications of the country simultaneously with their presentation to the Board, and before the Board had opportunity to make any defence; and

Whereas, The said college has not made any investigation of the methods or policy of the Board, and could not be in possession of information upon which to found such serious charges; and

Whereas, The secretary of the faculty admitted to the secretary of the Board that the resolutions were adopted without due consideration, and were not so applicable to the present Board; and

Whereas, In the past two years no certificate has been granted to any applicant upon an average rating of less than 80 per cent. on all branches, and the questions and examination papers and a tabulated record of all examinations are preserved, and are matters of record in the office; and

Whereas, It is not in the province of the Board to adopt any policy regarding the admission to its examinations of non-graduates, the law prescribing that "non-graduates shall submit themselves for examinations," and further prescribing that "the examinations shall be of an elementary and practical character." Therefore, be it

Resolved, That justice demands that the faculty of the Northwestern University Woman's Medical College, and all others interested, inform themselves as to the methods and policy of the Illinois State Board of Health in conducting its examinations, with a view to the establishment of the charges made, or of making such withdrawal, alteration, or explanation of the charges as the facts may warrant; and, further, that the faculty inquire as to whether any individual interest or personal animosity prompted the drafting and circulating of the resolutions.

(Signed) B. M. GRIFFITH, M.D.,
SARAH HACKETT STEVENSON, M.D.

For the Prevention of Blindness.—The following is the text of the legislation recently enacted in the State of Pennsylvania and approved by the Governor:

SECTION 1. Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania in General Assembly met, and it is hereby enacted by the authority of the same, that should one or both eyes of an infant become inflamed or swollen or reddened at any time within two weeks after birth it shall be the duty of the midwife or nurse or other person having the care of such infant to report in writing within six hours after the discovery thereof to the health-officer or legally qualified practitioner of the city, town, or district in which the mother of the child resides the fact that such inflammation or swelling or redness exists.

SECTION 2. That it shall be the duty of said health-officer immediately upon receipt of said written report to notify the parents or the person having charge of said infant of the danger to the eye or eyes of said infant by reason of said condition from neglect of proper treatment of the same; and he shall also enclose to them directions for the proper treatment thereof.

SECTION 3. Every health-officer shall furnish a copy

of this act to each person who is known to him to act as midwife or nurse in the city or town for which such health-officer is appointed, and the Secretary of State shall cause a sufficient number of copies of this act to be printed and supply the same to such health-officers on application.

SECTION 4. Any failure to comply with the provisions of this act shall be punishable by fine, not to exceed two-hundred dollars, or imprisonment, not to exceed thirty days, or both.

Doctor of State Medicine.—Rush Medical College of Chicago offers a degree in State medicine to graduates of not less than one year's standing who shall pass a rigid examination, including State medicine and hygiene, chemistry, physics and meteorology, engineering, morbid anatomy, vital statistics, medical jurisprudence, and law, after having completed six months' practical instruction in a laboratory approved by the faculty, and studied practically out-door sanitary work for four months under an approved officer of health.

The Medical Profession in Belgium.—The total number of qualified practitioners in Belgium is 2950. Of these, 884 dispense their own medicine. The proportion of doctors to population is 1 in 2122. The number of practitioners in Brussels is 558, being in the proportion of 1 to 1370 inhabitants. The proportion at Liége is 1 to 1771; at Ghent, 1 to 2186; and at Antwerp, 1 to 2251. There are in Belgium 2372 midwives, or 1 to every 2640 of population.—*British Medical Journal.*

A Medical School for Women in Russia is to be established at St. Petersburg, with means supplied from private resources. The curriculum is to correspond with that adopted by other foreign universities, and is to extend over a period of five years. Women under the age of twenty-one can only matriculate on the written permission of parents or guardians; married women on that of their husbands.

Professor Thomas H. Huxley, the distinguished scientist, died June 29th at Eastbourne, England, at the age of seventy years. He contributed liberally to a wide range of scientific subjects, and was an ardent disciple of Darwinian principles. Among his works are "Lectures on Comparative Anatomy" and "Lectures in Elementary Physiology."

Honors to Dr. Roswell Park and Dr. George Dock.—The degree of A.M. *honoris causa* has been conferred by Harvard College upon Dr. Roswell Park, of Buffalo, and Dr. George Dock, of Ann Arbor.

State Board of Medical Examiners of New Jersey.—At the June examinations of this Board over 40 per cent. (11 out of 26) of the candidates examined for licence to practise medicine in this State were rejected.

Professor Ewald Hering, of the University of Prague, has been made Professor of Physiology in the University of Leipsic as the successor to the late Carl Ludwig.

Dr. Luther F. Halsey, a prominent physician of Swedesboro, N. J., died suddenly on July 7th of angina pectoris, at the age of sixty-three years.

For the Report of the Trial of Amick vs. Reeves we have received from Dr. G. R. Fowler, $1.00; Dr. B. F. Miller, $1.00; Dr. Edmond Souchon, $5.00; Dr. George E. Jones, $2.00.

Dr. Ernest Laplace, of Philadelphia, has had the degree of LL.D. conferred on him by Georgetown University, of Washington, D. C.

Professor Mikulicz has been designated the successor of Trendelenburg in the Chair of Surgery in the University of Bonn.

Dr. Frederick T. Roberts has been appointed Professor of Medicine in University College, London.

Dr. Edward R. Palmer, of Louisville, lost his life in a bicycle collision on July 5th.

BOOKS AND PAMPHLETS RECEIVED.

Sectarianism in Medicine. Distinctive Features of Existing Medical Sects. By Edwin J. Kuh, M.D. Reprinted from the Journal of the American Medical Association, 1894.

Two Months' Service at the Methodist Episcopal Hospital, Philadelphia. By Edmund W. Holmes, M.D. Pamphlet. Read before the Philadelphia County Medical Society, 1894.

Report of a Case of Bifid or Double Uvula. By Hal Foster, A.B., M.D. Reprinted from the Western Medical Journal, 1894.

History of a Case of Indurated (Hunterian) Chancre of the Eyelid. By Charles A. Oliver, A.M., M.D. Reprinted from the Codex Medicus Philadelphiæ, 1894.

Description of an Artificial Eye Intended for the Study of Ophthalmoscopy and the Objective Determination of Ametropia. By Charles A. Oliver, M.D. Reprinted from the American Ophthalmological Society Transactions, 1894.

Some Additional Studies upon the Clinical Value of Repeated Careful Correction of Manifest Refractive Error in Plastic Iritis. By Charles A. Oliver, A.M., M.D. Reprinted from the University Medical Magazine, 1894.

Adenoids, with a Description of New Instruments for their Excision. By Arthur G. Hobbs, M.D. Read before the Tri-State Medical Association, Atlanta, 1894.

Scopolamin Hydrobromate. By Arthur G. Hobbs, M.D. Reprinted from the Atlanta Medical and Surgical Journal, 1894.

The Droitwich Brine Baths as Therapeutic Agents in Various Diseases. By W. H. Tomlins, L.R.C.P. (Lond.), M.R.C.S. (Eng.). Pamphlet. London: H. K. Lewis, 1895.

Lues Venera. By Henry Alfred Robbins, M.D. Reprinted from the Virginia Medical Monthly, 1895.

Vital Statistics of the City of Binghamton, N. Y. Annual Statement for the Year Ending December 31, 1894. By Daniel S. Burr, M.D., Health Officer and Registrar of Vital Statistics.

Kongenitale übermässige Entwickelung des S. romanum, Darmverschluss. Von Dr. H. Eisenhart. Sonder-Abdruck aus dem Centralblatt für innere Medicin, 1894, No. 49.

Festschrift zum fuenf-und-zwanzig-Jaehrigen Jubilaeum des Vereins Deutscher Aerzte zu San Francisco, Californien, 1869–1894. San Francisco, Cal.: Druck von Schmidt Label and Litho. Company.

Surgical Nursing. By Bertha M. Voswinkel. With 111 illustrations. Philadelphia: P. Blakiston, Son & Co., 1895.

Neudorfer's Method of Amputating Extremities, with a Report of Two Thigh-amputations. By A. H. Meisenbach, M.D. Reprinted from the Annals of Surgery, 1894.

Last One-hundred Abdominal Sections for Removal of Ovarian Tumors and Diseased Uterine Appendages. By R. Stansbury Sutton, M.D. Reported by J. P. Hunter, M.D. Reprinted from the Pittsburg Medical Review, 1894.

Biographical Sketch of Prof. John M. Scudder, M.D. By J. U. Lloyd. Pamphlet. Cincinnati, Ohio, 1895.